STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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As the Editor Views the News

THE Garrison finish which industry is displaying in the home stretch of 1936 is going to lift some of the annual production records to almost incredible heights. For instance, steel ingot output seems to be heading for an annual total of 47,876,700 gross tons. The three highest points in ingot production in previous years were 54,850,433 tons in 1929; 50,325,393 in 1928; and 46,936,205 in 1926. Therefore, if the foregoing estimate by STEEL, or the estimate of 47,700,000 tons by Walter S. Tower (p. 20), proves to be reasonably accurate, steel ingot output in 1936 will rank third in the history of the industry.

• • •

Will Business Need Brakes?

General activity in the metalworking industries is keeping pace with steel production. STEEL's index of activity now stands at 114.1 (p. 36), the highest point recorded since the week ending Aug. 31, 1929. The rapid expansion of business in recent weeks and the accompanying flurry of advances in commodity prices have revived discussion as to methods of curbing a runaway situation. For the first time since 1929, the word "boom" is finding its way into every day conversation. Remembering that fateful year, responsible persons in government, finance and industry will try not to repeat the mistakes of that period. Various "brakes" are being proposed.

• • •

Labor Dodges Responsibility

No artificial braking applied from Washington or from the control centers of finance and industry will be required if labor difficulties continue to mount as they have in the past few weeks. A considerable portion of the present widespread labor trouble can be traced to "outlaw" strikes. This suggests that the professional labor unions, to which President Roosevelt presented unprecedented opportunities for leadership and participation in national problems, are exhibiting a shocking inability or unwillingness to assume responsibility. This was a strong point in President Chester's program for industry (p. 35), submitted to National Association of Manufacturers. It deserves to be given stronger emphasis. Recent laws have held employers accountable for their acts, but have not imposed similar conditions upon professional union leaders or organizations. As long as this one-sided arrangement exists, progress in labor relations will remain at a standstill.

• • •

Respects Its Obligation

The question of responsibility has arisen in the controversy over employe representation plans under the Wagner act. Vice President L. H. Burnett of Carnegie-Illinois, speaking for the company at a hearing before the National Labor Relations board (p. 22), asserted that as a party to a contract with its employes, the company "will respect its obligation" through "every possible lawful effort to maintain the legality of the employe representation plans and continue to deal with its employes thereunder." Right now it would be interesting to check current cases of labor difficulty and to record the number of instances in which professional labor unions have not "respected their obligations" in regard to contracts with employers or in dealings with their own members.

• • •

Move Work; Cut Costs

Stainless steel affords a comparatively new medium for artists and craftsmen to display their skill. A Chicago manufacturer is producing stainless steel serving ware of striking beauty (p. 48) by applying modern methods of etching and forming. The results indicate that we only faintly realize the possibilities in the use of stainless steel in architecture and in the decorative arts. . . . How materials handling is the key operation in mass production and assembly is indicated by the layout of a Cincinnati metal furniture plant. Here parts are handled and units assembled (p. 45) according to the practice developed in the automotive industry. A check up of operations in many plants probably would reveal numerous instances where moving the work mechanically to stationary workmen would facilitate production and assembly.

E. L. Shaner

1936 Third Largest in Steel Ingot Output; 87% of 1929 Peak; Earnings Only 30%

ALTHOUGH steel production in 1936 was 87 per cent of the 1929 peak, the industry's earnings were only 30 per cent as much as in 1929.

Earnings for the year amount to about $150,000,000, representing a return of 3 per cent on invested capital, compared with 4.5 per cent in 1930 and 10.4 per cent in 1929.

Only twice before in history was a larger tonnage of steel ingots produced than in 1936. In a year-end review of the industry, Walter S. Tower, executive secretary, American Iron and Steel institute, estimates the output of ingots at 47,700,000 tons.

This was exceeded only in 1928 and 1929. The 1929 peak was 54,900,000 tons. In 1935 production amounted to 33,900,000 tons, so the increase in 1936 was 40 per cent—far ahead of most forecasts at the beginning of the year. Ingot output in 1928 totaled 50,325,393 tons. The 1926 total was 46,936,205 tons.

"Steel mill activities steadily advanced throughout the year," says Mr. Tower. "The operating rate for the first quarter was close to 55 per cent. During the third quarter, contrary to traditional seasonal tendencies and general expectations, the rate rose to 72 per cent, moving up to 78 per cent in the final quarter.

Heavier Products Pick Up

"Production of lighter steel products, such as sheet and strip steel, continued at a high rate during 1936, reflecting the large volume of automobile production and activity in other lines manufacturing consumer goods. Meanwhile, for the first time since the depression started, there was a notable expansion in demand for heavy products such as shapes, rails, railroad car material and pipe.

"Increasing output of these materials brought a better balance in the use of steel mill capacity. Production of these heavy lines, however, continues both actually and relatively to lag behind the output of lighter material.

"At the start of 1936 the number of employes in the industry was 454,000, while the October total had reached 531,000, the highest ever recorded and nearly 15 per cent more than the number employed in 1929.

"The year was marked by improvement in the position and earning power of workers in the industry. Many employers granted vacations with pay to wage earners and also established the general practice of paying time and a half for work over eight hours a day or six days a week.

Wage Increase Boosts Payroll

"The November wage advance averaging about 10 per cent represented an addition of approximately $75,000,000 annually to the payrolls in the industry. As a result the aggregate payroll now is at the annual rate of $936,000,000.

"The basic rate for wage earners in the industry has been increased nearly 60 per cent since 1932. With the latest increase it stands 19 per cent above the 1929 level and is the highest ever received by steel workers. The average hourly earnings of wage earners in the industry are about 73 cents, compared with 65.4 cents in 1929.

"In order at least partly to offset greatly increased costs resulting from the wage advances, higher priced materials, increased taxes, and other factors, steel producers generally announced price advances ranging from $2 to $5 a ton on the various products late in the year, to apply on first quarter business in 1937.

"Average prices for steel products sold in 1936 showed a decline of about $14 a ton from the most recent peak in 1923, and the resulting saving during the year to the consuming public was approximately $450,000,000. For automobile manufacturers alone the saving was $96,000,000.

"During the past few years the industry has done more than supply steel for current requirements of its customers. It has been putting its house in order for the future, spending about $340,000,000 on new construction and equipment during 1935 and 1936.

To Build New Capacity

"Plans were announced for the building of additional pig iron and open-hearth steel capacity, the new blast furnace being the first since 1930, and the new open hearth furnaces the first since 1931.

"The most significant development affecting facilities has been the further construction of new continuous wide strip mills. Three of

GUIDING STRIP INTO THE COILER: As the ribbon of steel leaves the last stand of the 96-inch continuous mill passing rapidly over the rollers it is cooled with a shower of water. The young man with the steel bar keeps it moving straight along to the coiler. Photo, South Chicago works, Carnegie-Illinois Steel Corp.

these new mills were put in operation in 1936 and construction is under way, or about to be started, for six more. This will increase the total number of continuous sheet and strip mills in 1937 to 24 with total annual capacity of more than 11,000,000 tons.

"Those new mills have been built in response to a rapidly expanding demand for wide sheets and strips. In part, this demand reflects many relatively new uses for steel such as all-steel automobile bodies and tops, mechanical refrigerators and steel furniture.

"The industry enters 1937 in the confidence that it has not only kept pace with its markets, but that it has foreseen future needs and has made adequate preparations to meet them."

Nearly Half of Steelmaking Capacity Is Concentrated in Four Counties

FOUR counties contain 41 per cent of the pig iron and steel ingot capacity of the United States and four additional counties hold 17 per cent more, giving a total of 58 per cent for the eight counties.

This exhibit of capacity concentration is shown in a study of basic industrial markets by the bureau of foreign and domestic commerce. The purpose of the study is to enable industrial marketing executives to form a quick conception of the size and location of those sections of their market represented by the steel industry. This is visualized as an aid to manufacturers of industrial goods to meet requirements of these markets.

Capacity for production of steel ingots and steel for castings is located in 67 counties but by far the greater portion is in the area between Philadelphia and Chicago and between Buffalo and Baltimore. There also is some capacity in the districts surrounding Birmingham, Ala., Denver, San Francisco, Los Angeles and Seattle.

Six States Represented

Allegheny county, Pennsylvania; Mahoning county, Ohio; Lake county, Indiana, and Cook county, Illinois, contain 41 per cent of the pig iron and ingot capacity. Baltimore county, Maryland; Erie county, New York; Beaver county, Pennsylvania and Cuyahoga county, Ohio, contain 17 per cent additional capacity.

Concerning hot-rolled products the area of greatest concentration is in the same general territory but somewhat smaller. Allegheny, Mahoning, Lake and Cook counties contain approximately 39 per cent of the total, with Baltimore, Beaver and Erie counties in the second four, Trumbull county, Ohio, in this instance replacing Cuyahoga county. These eight account for over half.

In capacity for pipes and tubes Allegheny and Beaver counties, Pennsylvania, and Mahoning, Ohio, account for 58 per cent of the country's output. Cold-rolled strip is concentrated largely in Cuyahoga and Trumbull counties, Ohio, Wayne county, Michigan, and Hancock county, West Virginia. These four counties have almost 65 per cent of the total.

In sheets the picture is different. Four Ohio counties, St. Louis, Richland, Trumbull and Mahoning, have 28 per cent of national capacity. Lake county, Indiana, with St. Louis, Richland and Trumbull, Ohio, contain 34 per cent.

In tin plate, Lake county, Indiana, has almost twice the capacity of any other county. This county and Allegheny county, Pennsylvania, with Jefferson and Lawrence counties, Ohio, provide 44 per cent of the total.

Concentration of capacity in cold-drawn bars is even more evident than in other products. Allegheny and Beaver counties, Pennsylvania, St. Louis county, Ohio, and Cook county, Illlinois, account for 70 per cent of the total and Lake county, Indiana, and Wayne county, Michigan, carry the total to 82 per cent of national capacity.

Equipment Orders Still Climbing

FOUNDRY equipment orders in November gained 15 per cent over October and reached the highest point since 1929, according to the index of the Foundry Equipment Manufacturers association, Cleveland.

The average of net orders was 200.4 in November, compared to 173.8 in October, and 99.8 in November, 1935. In October, 1929, the index reached its highest point, 245.3. The index is computed on a base of 100 per cent for 1922, 1923 and 1924.

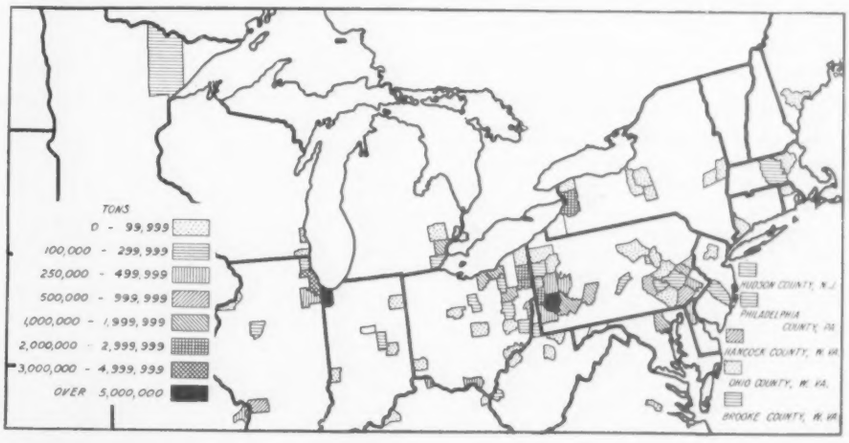
The index of machine tool and forging machinery orders which the association compiles, and which is based on 1926 as 100, showed gross orders at 265.2 in November, compared to 246.1 in October and 177.8 in November, 1935.

Machine tool orders in November increased 8 per cent over October and made a gain of 49.2 per cent over November, 1935, according to the index of the National Machine Tool Builders' association, Cleveland.

The active demand raised the November average to 147.1, only three points below the July, 1936, average which was highest since 1929. In October the index of orders, based on the volume of shipments for 1926, stood at 136.5 and in November, 1935, it was at 98.6.

Both foreign and domestic orders showed gains over October. The domestic trade at 110.7 was 16 per cent higher than the 105.4 average in October. The foreign rate increased from 31.1 in October to 36.4 in November.

Distribution of Combined Hot-Rolled Producing Capacity



CONCENTRATION of facilities for producing hot-rolled steel is indicated in this portion of the United States map. In addition to producing areas indicated there is some capacity in the districts about Birmingham, Ala., Denver, Seattle, Los Angeles and San Francisco

Challenge Board's Actions On Representation Plans

WITH John L. Lewis and other labor leaders present, the national labor relations board last Thursday began a series of hearings in connection with its charge against the United States Steel Corp., and the Carnegie-Illinois Steel Corp. that they interfered with the self-organization of their employes in the latter's 21 steel plants.

The Carnegie-Illinois corporation declared its intention to support determinedly its three-year old plans of employe representation, and denied the right of the board to interfere with its employe dealings under the Wagner labor relations act.

The United States Steel Corp. entered the scene solely to ask dismissal of the accusation through a challenge of the validity of the Wagner act, to assert that it is not a party to the plans under attack and that it is not the employer of the employes affected.

L. H. Burnett, Pittsburgh, vice president of Carnegie-Illinois, speaking for the subsidiary company, asserted that as a party to a contract with its employes the company "will respect its obligation" through "every possible lawful effort."

"The employe representation plans have proved the best ones devised for the settlement of all questions between the employes and management regarding wages, hours, working conditions and such subjects," said Mr. Burnett.

"Since the Carnegie-Illinois corporation has agreed with its employes that the plans shall remain in full force and effect until the employes decide to terminate them, the company will respect its obligation and make every possible effort to maintain the legality of the plans and continue to deal with its employes thereunder."

Freedom in Company Plan

In answer to the accusation of company domination, coercion, and intimidation of employes, Mr. Burnett said:

"The representatives have shown clearly by their independent attitude in making requests and demands upon the company that they are entirely free in representing their constituents.

"Their demands have been made openly and, solely upon the initiative of the representatives, have been printed in the public press, which indicates that the representatives know that they are free to act for their constituents in accordance with their honest beliefs."

Mr. Burnett and his associates, William Beye, Chicago, and John J. Heard, Pittsburgh, attorneys for Carnegie-Illinois, attacked the constitutionality of the act, and expressed the opinion that results of various previous similar attacks should be decided before the current accusation rightfully might be aired before the board.

Mr. Burnett pointed out that the elected representatives of the Carnegie-Illinois corporation's employes are not parties to the board's current proceedings and have not received any notice that the validity of the plans is being attacked. He said it was the company's belief that these men should be given an opportunity to participate in the proceedings.

Since the introduction of the plans more than 90 per cent of Carnegie-Illinois' employes have participated in them by casting their ballots for representatives. When in February, 1934, a number of amendments recommended by the elected representatives were adopted, more than 90 per cent of the employes voted upon and endorsed the plans as amended. Of 4204 requests on related subjects such as wage adjustments, better working conditions, etc., presented by the elected representatives up to July 1, 1936, in Carnegie-Illinois plants, 2514 were acted upon favorably to the men, 218 were compromised and 1090 were denied. Cases withdrawn totaled 229 and only 153 were left pending on that date, when last a compilation was made. Wage adjustments totaled 1578 during the period.

Testimony by Lewis Ally

The first day was devoted mainly to hearing and overruling motions for more time in which to prepare a defense.

Elmer J. Malloy, chairman of the employes' representatives at Carnegie-Illinois Duquesne works, and a Lewis ally, gave the principal testimony Friday in an attempt to substantiate the board's charges. He said employes had no choice but to accept the representation plans proposed by the company. He stated that employes were paid as much as $105 per month by the company for services as representation officials; that these sums in addition to their regular wages, would be based on time spent at "company union meetings."

"If anything happens to displease the management," he said, "there always are three or four meetings called to change our minds."

Philip Murray, of the steelworks' organization committee, in his testimony criticized the plans as a flagrant violation of the labor relations board act. He charged that the company used spotters to inform plant superintendents which workers attend steel organizing committee meetings.

The hearings were adjourned Saturday until Jan. 11.

Appointed Executive Head of Bolt, Nut, Rivet Institute

Herman H. Lind

EFFECTIVE Jan. 1, Herman H. Lind has resigned as general manager, National Machine Tool Builders association, Cleveland, to become executive vice president, American Institute of Bolt, Nut and Rivet Manufacturers, Cleveland.

Mr. Lind became associated with the Machine Tool Builders association in September, 1932. Previously he was identified for two years with the foundry industry as general manager of the Malleable Iron Research institute and as a business consultant. Prior to that he was employed 17 years by the Ohio Body & Blower Co., Cleveland, where his activities included direction of plant operations, sales engineering, manufacturing and accounting.

Fewer Steel Stockholders

United States Steel Corp. common stockholders of record Dec. 1, numbered 171,101, a decrease of 4243 since Aug. 31, the corporation reports.

Preferred stockholders of record Nov. 2 totaled 61,218, a decrease of 208 since Aug. 1.

Machines Steady Container Output and Employment

IMPROVED machines in the tin container industry have not resulted in decreased employment, but has lightened work, according to a survey of the American tin plate industry made by the Battelle Memorial institute, Columbus, for the International Tin Research and Development council, London.

"The tin can is a typical example of methods of mass production and mechanism from the mining of the iron ore to the finished can," it says. "Labor-saving devices, costing hundreds of millions of dollars to install have resulted in a better and cheaper product which is in such great demand that as much labor is required as before, but it is engaged in far pleasanter tasks.

"Making tin plate has in the past always involved a great deal of labor. From the days when the base plate was all pounded out by hand, and the thin sheet thoroughly scoured by hand before being laboriously dipped in tin and polished, improvements came with comparative slowness." Little by little, various operations came to be done by machine rather than hand labor. Invariably the use of labor-saving equipment aroused apprehension on the part of the workman; just as invariably the greater economies effected or better product produced increased the demand.

"The evolution in tin-plate making has become tremendously accelerated in recent years. Other than controlling the machines, the only physical labor directly involved in many of the modern American plants is the inspection of the finished tin plate, which is done by women."

Holds Steady in Depression

The institute says no American industry has a better record for steadiness of employment or for maintenance of returns to stockholders throughout the depression than has that of canmaking. The chief reason for this record lies in the technical perfection of manufacturing methods, which combine high speed economical production with high quality. The most modern tin-plate plants are marvels of complex, high speed, synchronized mechanism, turning out wide strip true to gage and of superior properties at a rate unheard of a few years ago. The canmakers have shown equally remarkable achievements. Although cans are made at the rate of 300 to 400 per minute, they are so well made and so well inspected that can makers often guarantee that at least 998 out of 1000 will show no failure of the can in service.

"In the years of depressed business conditions the tin plate and canmaking industries have been outstanding examples of sustained productivity and steady employment. Steel production as a whole has, in recent years, varied from around 15 per cent, to around 60 per cent of capacity. Tin plate production, however, has seldom swung outside the limits of 60 to 90 per cent of capacity, even though the food-packing industry, indirectly the largest consumer of tin plate, is seasonal. This is due, of course, to the fact that people must eat, irrespective of the ebb and flow of business."

High Per Capita Output

About 100 cans per year are made in the United States for every man, woman, and child in the country. In 1935 about 12 billion cans of all sorts were made from tin plate.

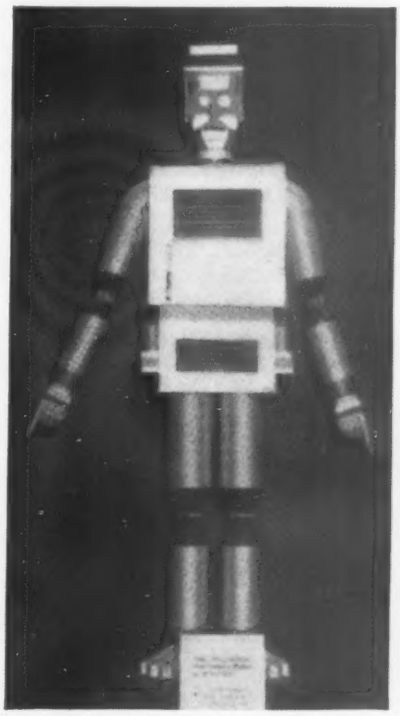
The United States is the largest producer of tin plate, the largest user of canned goods, and the largest user of tin. Widespread acceptance of the convenience and healthfulness of canned food and the general utility of packaging in cans, plus the constant efforts of canners, canmakers and steel makers to perfect and cheapen their products, has built up a huge and a steady market.

Excess Capacity Is Small

The American tin plate industry is said to be in a healthful, prosperous condition, and gives every indication of remaining that way for some time. There is no large excess of producing capacity nor anything approaching a shortage in capacity. One new plant has been built recently and others are being enlarged, but not in excess of reasonable expectations in the growth of the industry. Production is so divided among a large number of independent companies that fair prices and constantly improved products are warranted by their keen rivalry.

"A very helpful co-operative attitude has been developed between tin plate producers and the canmaking companies. By using their combined research facilities, excellent progress is being made in solving problems of mutual interest. Indications are that continued research in developing new markets will be carried out in the future."

U. S. Labor Department's Mechanical Man Defends Machines



MONTHLY LABOR REVIEW, for November, published by the department of labor, contains a lengthy description of the department's exhibit at the Texas centennial exposition the past summer, which some millions of persons may have overlooked.

Central figure in the display was this mechanical man, who spoke (undoubtedly the sentiments of the department), and pointed to illustrations, among them being one of a steel mill, to bear out his argument. Listen:

"I typify the modern machine in industry," he says. . . "It is true that I have taken the places of hand workers in some employments. Over here [right] are some pictures that show why I am often feared. I admit that for a period of time in each instance my appearance on the scene temporarily took away the jobs of human beings—many thousands of them, in fact.

"But, in spite of that evidence, I am and can be a real benefactor to mankind. In almost every case where I appeared in industry, I actually created more jobs and provided more employment for men and women. I did this by cutting down the cost of goods or greatly increasing the production so that the product then could be sold at lower prices to more people, and thus built up a much larger business, which in turn required more people to be employed.

"On this side [left] are shown some of the good things I have done by creating and supplying a demand for new products; by placing all sorts of conveniences. . ."

Hanna Plans Blast Furnace, Ovens

ACCORDING to reports from Detroit late last week, Hanna Furnace Corp. has completed plans for a battery of coke ovens to cost approximately $6,000,000. The Hanna corporation is a division of the National Steel Corp., and makes pig iron for the Great Lakes Steel Corp., also a division of National Steel.

The installation will make the furnace plant on Zug Island at Delray, Mich., practically independent of outside sources for coke. Iron from the furnace is transported in 110-ton capacity, hot metal, mixer-type cars 3½ miles to the Great Lakes Steel plant and transferred directly for charging into the open hearths. Great Lakes last fall started operating its new battery of four open-hearth furnaces, now having 12 units.

The Hanna corporation also is negotiating for constructing a third blast furnace of 1000-ton capacity, on Zug island, and announcement is expected shortly.

At press time last week also came the information that Wheeling Steel Corp., Wheeling, W. Va., is making ready to blow in its blast furnace at Martins Ferry, O., idle seven years.

Production

HEAVIER operating schedules in six districts last week advanced the national steelworks rate 2 points to 79½ per cent. This compares with 52 per cent in the same week of 1935, and 63½ in 1929.

Youngstown—Unchanged at 79 per cent.

Cleveland—Gained 2½ points to 78 per cent, as National Tube Co. at Lorain resumed with an additional open hearth to operate 11, and Republic Steel Corp. operated 12 in the first part of the week and 13 the latter three days. Otis Steel Co. had seven on.

New England—Down 14 points to 77 per cent. This rate will likely hold this week.

Central eastern seaboard—Up 1 point to 50½ per cent, with a further gain before the end of this month predicted.

Chicago—Unchanged at 77 per cent, though this represents practical capacity in view of the inability of some plants to increase schedules further. Blast furnace schedules are steady with 28 of 38 stacks active.

Pittsburgh—Up 5 points to 80 per cent, highest for the district since spring of 1929 and based on a 78 per cent rate by United States Steel Corp. subsidiaries and an average of around 82 per cent for the independents.

Wheeling—Without change at 92 per cent, as there was an average of 34 open hearths out of 37 in the district making steel.

Detroit—Unchanged at 95 per cent of capacity, calculated on activity in 20 out of 21 open hearths.

Buffalo—Held at 84 per cent, with 31 open hearths in production.

Birmingham—Stepped up 2 points to 76 per cent, as Tennessee Coal, Iron & Railroad Co. resumed operations at another Fairfield open hearth, making eight at that point, and two at Ensley.

St. Louis—Increased to 80 per cent, a gain of 12 points. Twenty-five out of 31 open hearths are active, compared with 21 the week previous.

Cincinnati—Up 4 points to 96 per cent, when one open hearth, taken off for repairs, resumed.

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Dec. 19	Change	Same week 1935	Same week 1934
Pittsburgh	80	+ 5	40	26
Chicago	77	None	60½	36½
Eastern Pa.	50½	+ 1	35½	22
Youngstown	79	None	56	44
Wheeling	92	None	78	80
Cleveland	78	+ 2½	82	64
Buffalo	84	None	50	37
Birmingham	76	+ 2	35	30
New England	77	—14	83	50
Detroit	95	None	88	59
Cincinnati	96	+ 4	†	†
St. Louis	80	+12	†	†
Colorado	68	†	†	†
Average	79½	+ 2	52	37½

†Not reported.

Wellman Opens House; Families See Shop Work

Families of shop and office employes, Wellman Engineering Co., 7000 Central avenue, Cleveland, were entertained and conducted on an inspection trip of the shops Friday afternoon, Dec. 18. Several hundred witnessed electric welding and machine tool operations on various parts which, when assembled, make up massive material handling equipment.

Wheeling Awards Mills

Wheeling Steel Corp., Wheeling, W. Va., has awarded a contract to Blaw-Knox Co., Pittsburgh, for two 3-high sheet roughing mills with motors and controls.

Planned Economics Baffle Economist

INCREASED railroad freight traffic in 1937 will augment the purchasing of railroad equipment, said Col. Leonard P. Ayres, Cleveland economist, in his annual business review last week.

General business, he continued, probably will be better than in 1936; the automotive industry is likely to hold its leadership as the pacemaker in recovery; wholesale and retail commodity prices and the cost of living are likely to advance; the volume of new construction will increase but will not reach boom proportions; interest rates will continue low; bond and stock prices will be high; and genuine money inflation is unlikely.

Col. Ayres held that forecasting under present conditions was almost impossible. He asserted that the constitution has been unofficially amended to charge the national government with the responsibility for the economic conditions under which the population lives and works, that politics has assumed command over economics.

"It is impossible to predict or calculate what the combined results will be when numerous governmental agencies are putting into effect new laws, new regulations, and new policies, all designed to improve business and social conditions," he said. "Probably it is this fact more than any other which accounts for the unprecedented irregularity of the course of this recovery.

Building Construction Down

"It is an impressive fact that in this year of 1936, which is the fourth full-year of recovery, the volumes of new factory building, of new commercial building, of public utility construction, of new railroad equipment, and of new corporate financing, are all below those of the lowest year of the depression of 1921.

"These conditions are particularly noteworthy in view of the fact that our population then was 20,000,000 less than it is now. They emphasize the retarding effects which may result from the tendency of managed economics to make future planning difficult and dangerous.

"The prospect that the future holds for American business appears to be one characterized by governmental stimulation and repression, reward and penalty, opportunity and restraint. It promises to be a future shaped by the struggles of the managers of our official economics to maintain the continuing prosperity to which they are committed, while striving to avoid the boom which would precipitate the new depression that cannot be tolerated."

Men of Industry

ALEXANDER E. WALKER, general manager of sales, Republic Steel Corp., Cleveland, has resigned, to become executive vice president, Pittsburgh Steel Co., Pittsburgh, effective Jan. 1. In addition to the office of general manager of sales for Republic he was this year elected president, Truscon Steel Co., Youngstown, O., a subsidiary, and also was a director of various Republic subsidiaries.

Graduate of the University of Michigan in 1910, he joined LaBelle Iron Works, Steubenville, O., now a part of Wheeling Steel Corp., in 1911. Later he was assigned to the Chicago sales office of the company. In February, 1916, he went with the Republic Iron & Steel Co., the corporation's predecessor, as assistant manager of pipe sales; in 1919 he was named assistant general manager of sales, and in 1928 general manager of sales.

Alexander E. Walker

♦ ♦ ♦

J. M. Schlendorf, formerly manager of sales, alloy division, Republic Steel Corp., Massillon, O., has been appointed assistant vice president in charge of sales; Norman W. Foy, assistant general manager of sales, has been made general manager of sales; Frederick H. Loomis, formerly manager of sales, sheet and strip division, has been named assistant general manager of sales; and William J. Sampson Jr., formerly vice president of Steel & Tubes Inc., has been named assistant general manager of sales.

Mr. Schlendorf has been with the corporation since its organization in 1930. He joined Central Steel Co., Massillon, in 1917, as vice president in charge of sales and when the Central Alloy Steel Corp. was organized in 1926, he remained with the new company in the same position. Previously, he was in the sales department of the American Sheet & Tin Plate Co. His headquarters will be in Cleveland.

Mr. Foy succeeds A. E. Walker, who has resigned to become associated with Pittsburgh Steel Co. Mr. Foy, who was born in Baltimore, started in the steel industry at 16 and has spent his entire business life with steel companies, with the exception of one year during the World war. After spending five years in the Baltimore sales office of the Carnegie Steel Co., he joined Republic Iron & Steel Co. in 1918 as a salesman in its Philadelphia office. In succession he was in charge of the company's Philadelphia, Boston, Buffalo, Birmingham, and Chicago offices and in 1934 was transferred to the general offices of Republic Steel in Cleveland, as assistant general sales manager.

Mr. Loomis upon graduation from Williams college in 1911, joined Republic Rubber Co., Youngstown, O., as a salesman and was next made district sales manager at the Minneapolis office. In 1916 he became associated with the Trumbull Steel Co. and was successively salesman, district sales manager, assistant general manager of sales, and general manager of sales. In 1928, when Trumbull Steel merged with Republic Iron & Steel, he was made assistant general manager of sales.

Mr. Sampson, following graduation from Yale in 1920, became associated with Steel & Tubes. He began his active work in the mills and from there was transferred to the sales department. He was later manager of a plant in Toledo, then operated by the company, and then returned to Cleveland as vice president.

Martin H. Schmid, formerly assistant manager of sales, alloy steel division, Massillon, O., has been appointed manager of sales, succeeding J. M. Schlendorf. Mr. Schmid was graduated from Lehigh university as a mechanical engineer and has been with Republic and its predecessors since 1909. Mr. Schmid will have as assistant managers Gordon F. Hess and Clyde E. Roberts.

John V. Burley, who has been assistant manager of sales, sheet and strip division, will succeed Frederick H. Loomis as manager of sales, sheet and strip division. J. W. Carpenter will continue as assistant manager of sales, sheet and strip division.

The carbon bar division, with W. F. Vosmer as manager of sales, is

Figures in Republic Steel Corp.'s Sales Executive Promotions

J. M. Schlendorf

Norman W. Foy

Frederick H. Loomis

William J. Sampson Jr.

being expanded by the following additions: R. W. Hull, formerly assistant district sales manager at Chicago, has been appointed assistant manager of sales, and will move to Cleveland.

The die roll sales department which has been located at Buffalo with J. S. Langston as manager of sales is being combined with the carbon bar division in Cleveland, and Mr. Langston has been named assistant manager of sales.

♦ ♦ ♦

Frank Chiles, assistant manager of sales, bar division, Republic Steel Corp., Cleveland, has resigned. He first became connected with a group of United States Steel Corp. subsidiaries in 1902 in the New Orleans district sales office. In 1905 he was transferred to Pittsburgh and in the latter part of that year he went to the district sales office of the former Carnegie Steel Co. and Illinois Steel Co. in Cleveland where he remained until 1926. He then joined Corrigan, McKinney Steel Co., Cleveland, and was put in charge of the development of its new finished steel sales division, to handle the output of its bar mills, then being constructed. He continued in that capacity until the company became merged with Republic in September, 1935.

♦ ♦ ♦

C. A. Ingraham has been appointed purchasing agent, Pressed Steel Car Co., Pittsburgh, succeeding J. M. Tate, who had held the position for over 20 years.

♦ ♦ ♦

John W. Schultz, identified with Superior Steel Corp., Pittsburgh, for a number of years, has been named purchasing agent of the company, succeeding A. D. Feeman, who has been named credit manager.

♦ ♦ ♦

Alexander Best has been elected president and general manager, Riverside Steel Co., Wheeling, W. Va. Other officers elected include: Vice president and chief engineer, George E. Seibert; secretary-treasurer, Harry W. Eberts. Mr. Best was formerly an officer of William B. Pollock Co., Youngstown, O., and was connected with that firm for more than 20 years.

♦ ♦ ♦

G. S. McKee has been appointed general superintendent, Globe-Wernicke Co., Cincinnati. He recently resigned as head of the production engineering division, Baldwin-Southwark Corp., Philadelphia, subsidiary of Baldwin Locomotive Works. For several years he was associated with Timken Roller Bearing Co., Canton, as production manager, and also spent some time as superintendent of Grigsby-Grunow Co., Chicago. As chief assistant to F. A. Schmitz, vice president in charge of production, Mr. McKee will supervise the work of the steel, wood and paper divisions of the company.

Frank Chiles

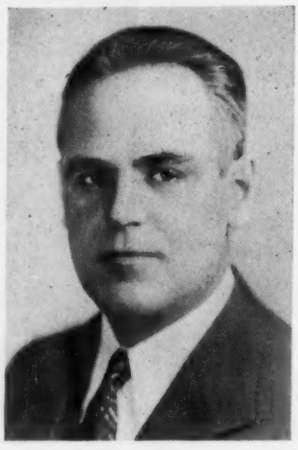
♦ ♦ ♦

William G. Costin, chairman of the board, Pittsburgh Screw & Bolt Corp., Pittsburgh, was honored on his sixty-second birthday Dec. 11 at an employes' party in the company's plant. In appreciation of his consideration for their welfare, it was announced, the party was sponsored by the shop employes' representation committee and was attended by 600 shop men, 100 office workers, as well as officials.

Accepting a hand-forged aluminum desk set gift from Joe Gideon, oldest employe, Costin attributed the company's success to the loyalty of its workers.

♦ ♦ ♦

E. P. Strothman has been appointed sales manager, ceramic products department, A. O. Smith Corp., Milwaukee. First associated with the A. O. Smith Corp. in 1929, Mr. Strothman has since served in the sales engineering and sales promotion departments of the company. For the past several years he has been active in the sales of glass lined tanks to the brewing and other industries. Mr. Strothman has also had considerable experience in sales and special analysis work in the utility, mining and general industrial fields.



E. P. Strothman

Died:

REESE LLEWELLYN, 74, retired steel executive and pioneer Los Angeles business man, of heart attack in New York, Dec. 16. Mr. Llewellyn for more than 40 years was active head of the Llewellyn Iron Works, Los Angeles, which merged with the Consolidated Steel Corp. in 1929. Born in San Francisco, Mr. Llewellyn went to Los Angeles and practically grew up in the steel and iron business. He founded the first sheet and plate mills on the West coast and built the Torrance plant, which is now among the Consolidated Steel properties.

♦ ♦ ♦

William P. Brennan, 64, chief compensation clerk, Edgar Thomson works, Carnegie-Illinois Steel Corp., at Pittsburgh, Dec. 15. He had been continuously in the employ of the company since 1887.

♦ ♦ ♦

Ralph C. Rose, 45, manager, Moloch Foundry & Machine Co., Kaukauna, Wis., in that city, Dec. 9. Before joining the firm about two years ago he was for some years sales manager of Stroh Die Casting Co., Milwaukee.

♦ ♦ ♦

Paul H. Smith, for the past ten years manager, Detroit district of Combustion Engineering Co. Inc., in Detroit, Nov. 23. Mr. Smith formerly was identified with the Westinghouse Electric & Mfg. Co., Pittsburgh & Butler street railway, and Brooklyn Edison Co. He was a member of the American Society of Mechanical Engineers.

Farrell and Schwab Attend Funeral of Willis L. King

James A. Farrell, formerly president, United States Steel Corp., and Charles M. Schwab, chairman, Bethlehem Steel Corp., were honorary pallbearers at the funeral Dec. 14 of Willis L. King, director of Jones & Laughlin Steel Corp., and long an executive of the firm. Other honorary pallbearers, mainly directors of Jones & Laughlin were: W. W. Willock, S. E. Hackett, H. E. Lewis, F. E. Fieger, W. B. Todd, M. C. Angloch, W. J. Creighton, W. C. Robinson, J. C. Watson, W. D. Evans, W. C. Moreland, William Larimer Jones Jr., B. F. Jones III, G. M. Laughlin III, Leslie I. Laughlin and G. M. Laughlin Jr.

Manufacturers Association Elects New Directorate

Executive officers of the National Association of Manufacturers will be elected at the first meeting of the new board of directors in New York, Jan. 22. The directors were elected at the annual meeting in New York, Dec. 9-10.

Among the new directors are: Reese N. Taylor, president, Consolidated Steel Corp. Ltd., Los Angeles; F. F. Barnes, chairman of the board, Wallace-Barnes Co., Bristol, Conn.; C. R. Burt, president, Pratt & Whitney division, Niles-Bement-Pond Co., Hartford, Conn.; Alfred Kaufmann, president, Link-Belt Co., Chicago; Howard Coonley, president, Walworth Co., Boston; W. L. Huff, treasurer, Minneapolis-Honeywell Regulator Co., Minneapolis; Howard I. Young, president, American Zinc, Lead & Smelting Co., St. Louis; Homer Forsythe, president, Hyatt Roller Bearing Co., Newark, N. J.; Hilland G. Batcheller, president, Ludlum Steel Co., Watervliet, N. Y.; J. F. Lincoln, president, Lincoln Electric Co., Cleveland; R. C. Kuldell, president, Hughes Tool Co., Houston, Tex.; T. W. Banfield, president, Iron Fireman Co., Portland, Oreg.

Club's 314 Members Boast 9300 Years' Service Total

Eighteen men were initiated recently into the Twenty-Five Year club of the York Ice Machinery Corp. at the seventh annual meeting of the organization in York, Pa. The 314 members of the club now have a combined total of 9300 years' service. There are five grades of membership, as follows: 25-year group, 127 members; 30-year group, 104 members; 35-year group, 67 members; 40-year group, 12 members, and 45-year group, four members.

William S. Shipley was elected president of the club. He told the group that "In industries like ours, where experienced engineers and workmen are so essential to the success of the business, we are very fortunate in having so large a group of our men eligible for membership in the club."

More Firms Raise Wages

Pangborn Corp., Hagerstown, Md., manufacturer of blast cleaning and dust collecting equipment, has announced a 10 per cent increase in hourly and piece work rates, and a standard 45-hour week, effective Dec. 30. The company paid a Christmas bonus to employes Dec. 17.

Tonawanda Iron Corp., North Tonawanda, N. Y., American Radiator subsidiary, has raised wages of all workers in its blast furnace plant 10 per cent.

Machinery Firm Celebrates Hundredth Anniversary

Tranter Mfg. Co., 105 Water street, Pittsburgh, machinists and machinery jobbers, celebrated its 100th anniversary Dec. 12 when a banquet for employes was given at the Roosevelt hotel, Pittsburgh. Founded by J. B. Sheriff, the company originally handled copper tubing and work largely in connection with steamboats.

Henry Tranter, president, began work as a bookkeeper in the year of incorporation, 1891.

Waste Materials Wholesale Value $400,000,000

Wholesale sales of all waste materials, including scrap iron and steel and nonferrous scrap metals, amounted to approximately $400,000,000 in 1935, according to Benjamin Schwartz, director general, Institute of Scrap Iron and Steel. This figure is based on a preliminary report just issued by the census bureau. Forty-eight hundred establishments in the waste materials trade reported a volume of $394,034,000, which represented an increase of 45 per cent over 1933.

Operating expenses for all firms amounted to $57,536,000, including a payroll of $30,704,000. The average number of employes for the entire year amounted to approximately 30,000.

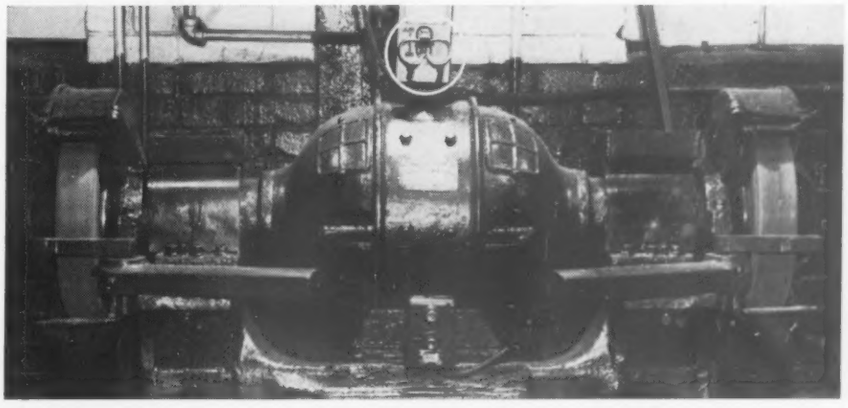
Sees Air Conditioning "Biggest Thing on Horizon"

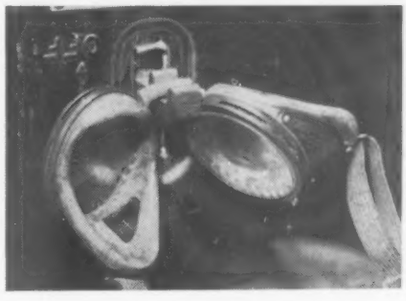
An estimated radio audience of more than 10,000,000 heard Ironmaster Bennett Chapple, vice president, American Rolling Mill Co., say in a recent broadcast: "Air conditioning is the biggest thing on the horizon today."

He emphasized that its development represents the co-ordination of basic industries such as electricity, fuel, insulating and iron and steel manufacturers. He reminded his audience that it was only a comparatively few years ago that Mark Twain humorously remarked, "We all talk about the weather, but nobody does anything about it."

"We are of the firm conviction that all kinds of products made of iron and steel sheets will establish new sales records within the next few years," said W. W. Sebald, the company's vice-president in charge of sales, in a recent interview.

Operator MUST Pick Up Goggles To Start Emery Wheel Motor





AN EMPLOYE in the slab yard of Weirton Steel Corp., Weirton, W. Va., worked out this novel safety device. To start the motor, with its emery wheels, it is necessary to lift a pair of goggles off the spring switch, shown in the ring. To stop it, the goggles are returned to the switch. A placard on the wall above the motor warns the operator to wear goggles to protect his eyes

THE NEW TYPE "DA" MULT-AU-MATIC

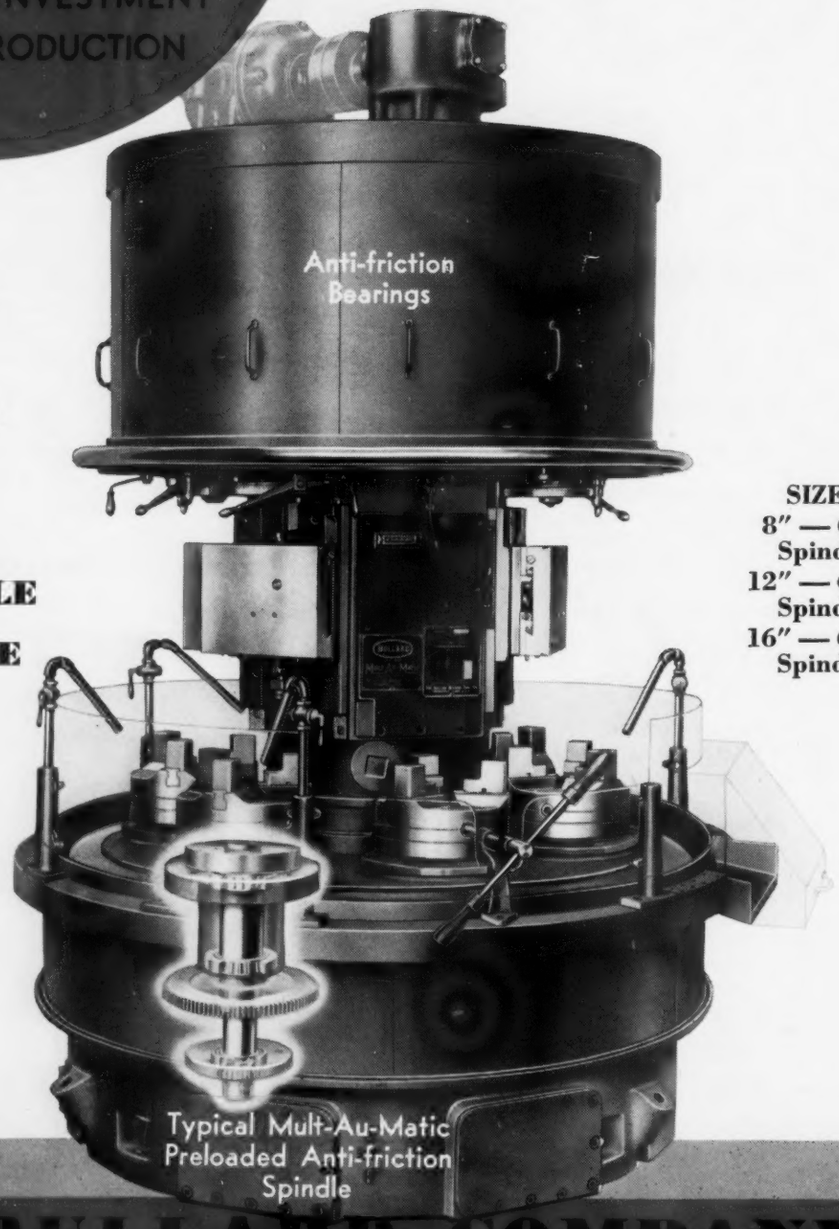
LOW INITIAL INVESTMENT
LOW COST PRODUCTION

Ask for information on this moderately priced unit as applied to your requirements.

This NEW Anti-friction addition to the Bullard Line of Mult-Au-Matics provides a Highly Economical production unit having the features of the Heavy Type "D" Mult-Au-Matics. The "DA"s are smaller in size, and yet provide the same chuck capacities as the larger Type "D"s.

Type "DA"s are in every way Efficient and Effective Low Cost manufacturing equipment.

- **FAST**
- **ACCURATE**
- **RIGID**
- **POWERFUL**
- **FLEXIBLE**
- **EFFICIENT**
- **DEPENDABLE**
- **PROFITABLE**



Typical Mult-Au-Matic
Preloaded Anti-friction
Spindle

SIZES
8″ — 6 & 8 Spindle
12″ — 6 Spindle
16″ — 6 Spindle

Inbuilt Power Operated Chucking

Independent and variable feeds for each tool head

THE BULLARD COMPANY

BRIDGEPORT CONNECTICUT

MIRRORS of MOTORDOM

DETROIT

FOR A month now, the automobile industry has been getting a taste of what it had expected eventually from the labor unions.

The regularity of strikes here since production started on the 1937 models has led not a few persons to speculate on where the next disturbance will be called. First Bendix, then Midland Steel Products, and last week Kelsey-Hayes Wheel Co., experienced labor difficulties.

And, of course, when such representative parts plants become inactive, the effect is deep because each of these leading parts plants caters, not to one, but to a number of the well-known automobile manufacturers.

Obviously, the unions have capitalized on such vulnerability, for with a minimum of effort—considering their own goals—they can realize a maximum effect.

This policy seems basic on the part of the labor unions, and hitting around the fringes (steering clear of a strike call in any of the larger assembly plants), is guerilla warfare in its purest essence.

Where guerilla warfare has been accepted as an old tool, something new for automobile workers has crept into these labor disturbances of the last month. Sit-down strikes, popularized by the Akron, O., tire workers, are the novelty.

Outside Interest Is Small

Formerly the strike tactics of the unions dumped the strikers out in the streets first off. Within recent years mass clashes occurred outside the Motor Products plant, at Electric-AutoLite, and at Hudson. But now, under the sit-down plan, the striker remains near an idle machine in a silenced plant, playing cards or listening to a radio.

There are no crowds in the streets, no stone fights, no bloodshed. Because the strikers are not openly obstreperous, the public and press have nothing to comment on. Therefore, outside interest in the issue is small, and this is a windfall to the unions.

The idleness is agonizing to management in a sit-down strike. The executives take just such steps as the Kelsey-Hayes management did last week in declaring that before conferences could be held with union officials the plant must be cleared of strikers and in operation again.

The United Automobile Workers, of which Homer Martin is president, fostered the Bendix, Midland and Kelsey strikes. This organization made a significant move by forming a joint council with the Flat Glass Workers, who called the Pittsburgh Plate Glass and Libby-Owens-Ford strikes.

Since bonuses apparently are no insurance against the calling of strikes, the automobile industry has turned to the philosophy of having as much material and finished parts as possible on hand.

Prices on steel, glass, rubber, lead and copper have all been headed higher for some time. Furthermore, the outlook is for still higher levels in 1937 in these automotive essentials.

Stimulates Buying Ahead

Realizing that the farther ahead it can buy materials the more money it will save and the less chance there will be of supply shortages due to strikes, the automobile industry seems to be killing two birds with one stone.

Forward buying has been followed in steel and parts to such an extent that obligations have been made for nearly all the automobiles to be built in the first half of 1937. Unfortunately for the automobile makers, they do not have the storage space to stock all of the steel and parts they would like to carry.

Because labor conditions at Akron have been quiet the last few weeks, motor makers have been capitalizing on this one score. At the rate tire production is now exceeding sales, some 1,000,000 tires a month are being added to inventories and total manufacturers' stocks are nearly 2,000,000 tires ahead of those a year ago.

By another week, almost 18,000,000 tires will be in stock for all makers, or almost eight months' supply for the replacement market. Most of these inventories are held at Akron but the fortifying effects are keenly felt in the motor plants at Detroit.

On the third major material—glass—the aforementioned Flat Glass Workers, headed by Glen W. McCabe, last week had virtually tied up some 90 per cent of the plate glass plants. Added to the Pittsburgh Plate plants, which have been idle since October because of the strike, Libby-Owens-Ford's plants at Toledo, O., and Charlestown, W. Va., went out Dec. 15.

Ironically, and this makes observers speculate on human nature, the Libby-Owens-Ford sitdown came just an hour after a $50 Christmas bonus to each employe had been distributed.

There is talk today in Detroit of a shortage of new cars, which probably isn't an exact statement, yet unfilled backlog reports of each of the motor makers are still substantially large at the beginning of Christmas week, a time in other years when some shutdowns might be ordered.

From advance word, only the day of Dec. 25 will be observed by the industry here, and a few of the lines and departments may even start up again for only Saturday, Dec. 26.

Ford Approaches Chevrolet

Chevrolet's total assemblies of roughly 30,000 last week topped Ford by around 2500 units. Each was on a five-day week in assembly plants, but a brake shortage at Ford is holding back assemblies from a projected 7000 daily. Ford has also been having some difficulties lately on glass surface defects at its own glass plant at Dearborn.

Last Friday Chevrolet officially was in its new plant at Indianapolis. A steel structure, it replaces six small buildings originally bought by General Motors from Martin Parry Corp. in 1930. Output of commercial bodies will center there.

The new plant, replete with three miles of conveyor system, three presses each 38 feet high and weighing 340 tons, in addition to more than 100 smaller presses, two 25-ton cranes and several batteries of weld-

Mirrors of Motordom

ers, has over 500,000 square feet of floor space.

Plymouth's assemblies at 13,000-odd models last week had fully recouped ground lost during the Midland Steel Products strike. Of the 13,000 models, in round figures, 10,500 came out of the Detroit plant and the balance was split about evenly between Evansville, Ind., and the Pacific coast divisions.

DeSoto, like Dodge and Chrysler, was also back in the running. Last week's total for the three lines under the Chrysler name proper was 2300 models; Dodge was at 8650 and the DeSoto aggregate was 2050 units.

The sum production of all Chrysler Corp. models in the present quarter will be around 270,000 units, and would have been about 300,000 models if it had not been for the Midland strike which cut off frames.

Even at 270,000 models, the quarter will be the second best in Chrysler's history, second only to 338,540 models made in the second quarter of this year.

In fact, it must be of considerable cheer to Walter Chrysler to review these facts: Chrysler's year in 1936 will likely touch 1,050,000 units, more than twice the 1929 production. This will be a 23 per cent share in all motor car production, against 20 per cent in 1935 and only 9 per cent share in 1929.

Chrysler in Select Circle

Furthermore, making more than a million cars a year has been done by only two others, so that Chrysler Corp. is now in the select circle.

In fact, the final count on the difference between Ford and Chrysler this year will be very close and not determinable before January. When all is said and done, it may be that the down-time Chrysler suffered from the Midland strike may come to be just the margin to swing the honor of second to Ford-Lincoln.

For eleven months of the year, Ford with Lincoln is estimated to have made 991,000 cars; all of the Chrysler units, 930,000. General Motors is, obviously, in first position with some 1,680,000 units for the first 11 months of 1936.

Last week Alfred P. Sloan, board chairman of General Motors, said the company's 1936 would go down as a 2,000,000-car year, a record high for General Motors and likely to be some 46 per cent of all the cars made and sold.

With Ford and Chrysler putting on almost a dead heat, and between them likely to account for 47 per cent of all the cars made, it looks that if General Motors' 46 per cent is cut in, that 93 per cent of the 1937 models will have names of the subsidiaries of the leading three.

The balance of seven per cent seems small for such companies as Packard, Nash, Hudson, Studebaker, and a few more, but in cold figures the foregoing paragraph tells the transition from the yeak year of 1929 to seven years later.

Total car production in 1936 will be about 800,000 models less than in 1929, yet Chrysler and General Motors are each making new highs for their entire history. The answer is a lag in Ford's production compared with seven years ago and the sharper decline for the independents, not to forget the death of some independents in the depression.

When all of the General Motors units and the Chrysler units are grouped under their two respective heads, fourth corporate position in the industry simmers down to Hudson, which last week was making about 4000 models.

Packard at 2760 assemblies was virtually unchanged from the week preceding. Lincoln made some 775 jobs in the week and once more was obtaining frames freely from Midland Steel Products Co.

To consider some of the others in motordom: Willys at Toledo, is trying to make 5000 units this month. Willys made its first export shipments (to South America, Europe and South Africa) last week, and reopened its Los Angeles assembly plant on Dec. 15.

Studebaker is about ready to announce its first commercial cars for 1937 and meanwhile is making around 500 models a day, or at an average of 2500 for the week.

Auburn has been releasing parts and materials recently against its present model, but it will probably be the cleanup, as some time in 1937 Auburn will drop its present six entirely and bring out a new model, with a rear-drive. In price, it will be higher than the present Auburn, but under the price of the Cord.

Meanwhile, practically all of Auburn's operations have been moved from Auburn, Ind., to Connersville, Ind., where the main plant and body division had been centered.

Nash has made a slight increase in its schedule and last week was up to 2200 finished models, compared with about 2050 two weeks ago.

Pierce-Arrow at Buffalo started a few passenger jobs down the line last week after being closed for two weeks. During the closed period, however, they averaged assembly of 10 to 15 trailers daily.

Old Name May Come Back

An old name in motordom is due for a revival, if plans of Norman DeVaux bear fruit. Mr. DeVaux is figuring on a plant site at Hagerstown, Md., for the manufacture of a small cheap car, chiefly for export. A large number of the old Continental fender and hood dies, stored at Salem, O., are likely to be used.

The plant at Hagerstown has been used in the past for the manufacture of organs and plans of the DeVaux management call for its use, not on a continuous assembly basis, but for running off accumulated order lots, chiefly for export.

DeSoto claims to have something new in automobile driveaways, a dealer who flies his customers direct to the DeSoto plant to take delivery on new cars. . . .Chrysler Corp. is expected to earn better than $12 a share in 1936. . . . .The Fisher Body plant in Cleveland will have a new die shop in 1937. . . . .Plymouth continues to draw heavily on an Indianapolis supplier for motor blocks. . . . Chevrolet will start a truck test soon that will run around the entire rim of the country. . . . .Pontiac claims it will have $3,000,000 worth of accessories' business in 1936.

Automobile Production

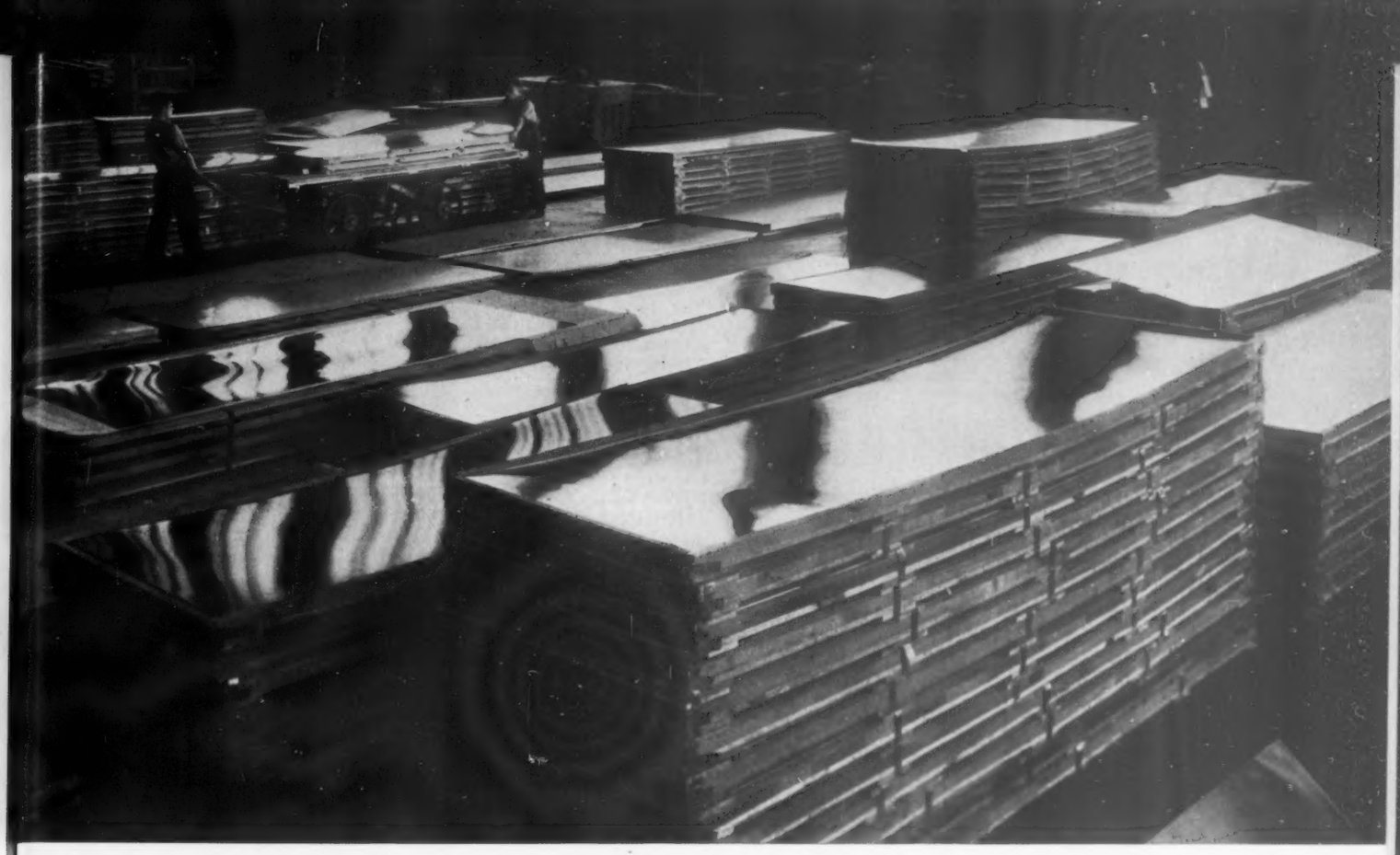
Passenger Cars and Trucks—U. S. Only
By Department of Commerce

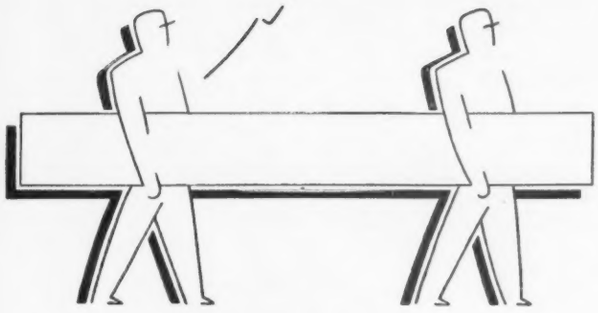
	1934	1935	1936
Jan.	155,666	289,728	364,004
Feb.	230,256	332,231	287,606
Mar.	338,434	425,913	420,971
Apr.	352,975	452,936	502,775
May	330,455	361,107	460,565
June	306,477	356,340	452,955
July	264,933	332,109	440,999
Aug.	234,811	237,400	271,291
Sept.	170,007	87,540	135,130
Oct.	131,991	272,043	224,628
Nov.	83,482	395,059	*419,700
11 mo.	2,599,487	3,542,406	3,980,624
Dec.	153,624	404,528	.....
Year	2,753,111	3,946,934	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:	
Nov. 21	110,160
Nov. 28	104,283
Dec. 5	100,395
Dec. 12	119,455
Dec. 19	121,038





ALL RYERSON WAREHOUSES
CARRY COMPLETE STOCKS OF

ALLEGHENY STAINLESS SHEETS *and* STRIPS

READY *for* IMMEDIATE SHIPMENT

Largest in the steel-service field—most experienced—handling Allegheny Stainless Steels exclusively—Joseph T. Ryerson & Son, Inc., is ever ready to serve your needs with a complete range of Allegheny Stainless Sheet and Strip.

Ten strategically located plants make it possible to guarantee *immediate shipment* of your order, whether in package or carload quantities.

Ryerson Engineers are available at a moment's notice to assist in problems of designing or applying Allegheny Stainless. Do not hesitate to employ their skilled services when needed—and remember, there is a Ryerson plant near you. Let it be your headquarters for stainless steel service.

Ryerson Warehouses are located at Chicago, Milwaukee, St. Louis, Detroit, Boston, Cleveland, Cincinnati, Philadelphia, Buffalo and Jersey City. Beside complete stocks of sheets and strips, Ryerson carries a full supply of Allegheny Stainless bars, pipe, tubing, wire, etc.

Allegheny METAL CONTROLS CORROSION — THE SAFE METAL

Controls Corrosion

ALLEGHENY STEEL COMPANY . . . BRACKENRIDGE, PA.
WEST LEECHBURG DIVISION

Sales Offices and Warehouse Stocks in the Principal Cities
Warehouse Stocks carried by JOS. T. RYERSON & SON, INC., WAREHOUSES . . . Union Hardware & Metal Co., Los Angeles . . . American Brass & Copper Co., San Francisco — Oakland
ALLEGHENY PRODUCTS: SHEETS FOR AUTOMOBILE BODIES, METALLIC FURNITURE, DEEP DRAWING; ALLEGHENY METAL, ALLEGHENY STAINLESS STEELS, ELECTRICAL SHEETS, HOT AND COLD ROLLED STRIPS, STEEL CASTINGS, SEAMLESS TUBING, BOILER TUBES, PIPE.
(Allegheny Metal is licensed under Chemical Foundation Patents Nos. 1,316,817 and 1,339,378)

Activities of Steel Users and Makers

EQUIPMENT and furnace of Buffalo Electric Furnace Corp., River road, Buffalo, has been purchased by Ludlum Steel Co., Watervliet, N. Y., which will use the plant to produce stainless steel and heat resisting castings. A new type electric furnace is included in the equipment purchased. The Ludlum company has been operating experimentally in the Buffalo plant for the past six months and it will operate the plant under the name of the Ludlum Foundry.

♦ ♦ ♦

Byrd Plumbers' Supply Co., Cleveland, has been appointed jobber of Republic steel pipe by Republic Steel Corp., Cleveland.

♦ ♦ ♦

Super Tool Co., Detroit, has moved its Chicago offices from 1618 West Fulton avenue to 656 Washington boulevard. Harry Beck has been appointed district sales manager at Chicago.

♦ ♦ ♦

Plans of the L. F. Kreger Mfg. Co., 540-550 West Thirty-fifth street, Chicago, provide for a rather elaborate expansion. The company now is installing a 300-ton press for production of hub caps, brakeshoes and similar parts, and general jobbing.

♦ ♦ ♦

Enterprise Engine Corp., Nineteenth street, San Francisco, bidding $28,695.62, San Francisco, has been awarded a 300-kilowatt diesel electric generating set for the Fort Peck dam on bids opened by the federal engineers at Kansas City, Nov. 16.

♦ ♦ ♦

Towmotor Inc., Cleveland, manufacturer of straight gasoline-powered material handling equipment, has appointed Henry M. Wood Co., Cincinnati, as representative for southern Ohio and Indiana, northern Kentucky and northwest West Virginia.

♦ ♦ ♦

Boston Gear Works Inc., North Quincy, Mass., has selected Cleveland as headquarters of the western sales division. Storeroom space of the Cleveland branch has been doubled and twice as much stock will be carried. L. W. Fitch is Cleveland branch manager.

♦ ♦ ♦

Bristol's Instrument Co. Ltd., maker of recording and controlling instruments, London, England, celebrated its fourth year of manufacturing Bristol instruments in England by moving to new quarters at Brent Crescent, North Circular road, West Twyford. This was necessitated by increased demand for the company's products. It forms part of a program of expansion which is being followed by the associated companies, Bristol Co. of Canada Ltd., Toronto, Ont., and Bristol Co., Waterbury, Conn.

♦ ♦ ♦

Libert Machine Co., Green Bay, Wis., has arranged for national distribution of its products through dealer organizations. The company manufactures special machines and tools, turret attachments for lathes, and particularly high speed shears for use on metal.

♦ ♦ ♦

George D. Miller Co., Cleveland, has been appointed exclusive representative by H. R. Krueger & Co., Detroit, of its complete line of drilling, milling, tapping and boring machines and drill heads, in northern Ohio. The company has also been appointed exclusive representative in northeastern Ohio by the Cleveland Planer Co., Cleveland, manufacturer of openside planers.

♦ ♦ ♦

H. Boker & Co., New York, sales representative for specialty steels, has acquired all rights to Kinite alloy die steel, including patents, goodwill, trade name and stock. Kinite will be available as heretofore in bars and in castings. All sales will be handled from the New York office and Kinite castings, formerly made at Fairmont, W. Va., will be made in Detroit. Next year the company will complete its hundredth year in business.

♦ ♦ ♦

York Ice Machinery Corp., York, Pa., has appointed the following new distributors of its commercial refrigeration and air conditioning equipment. Milburn Refrigeration Co., Kalamazoo, Mich.; Seuser Co., Alberta Lea, Minn.; York Refrigeration Products Co., Lansing, Mich.; Payne Motor Sales Co., Danville, Va.; Edward Joy Co., Syracuse, N. Y.; Charles C. E. Harris, Boston; Johnson Furniture Co., Shreveport, La.; Refrigerating Equipment & Service Co., Santa Rosa, Calif.; R. M. Wolf Co., Lincoln, Nebr.; Household Appliance Co., Sioux City, Iowa, and Sheldon Gordon, Wilmington, Del.

Canadian Output Gains

Steel ingot and casting production in Canada in October was 98,330 gross tons, compared with 86,077 tons in September, and 95,016 in October, 1935. For ten months output was 912,064 tons, compared with 742,720 tons in the period last year.

Pig iron production in October was the highest of the year at 70,051 gross tons, a rise of 35 per cent over September's 51,892 tons. For ten months pig iron output was 535,836 tons, compared with 464,585 tons in ten months of 1935. Ferroalloy production in October was 5253 tons; in September 5027 tons. For ten months the total was 61,340 tons; in ten months last year, 47,520 tons.

Census Figures Show Gains In Pig Iron, Ferroalloys

A substantial increase in employment and a pronounced gain in production in blast furnaces in 1935, compared with 1933, are shown by preliminary figures compiled from returns of the biennial census of manufactures, department of commerce.

The number of wage earners employed in blast furnaces last year, 15,021, represents an increase of 24.2 per cent over the 12,098 reported for 1933, and their total wages, $18,718,727, exceeded the 1933 figure by 61.9 per cent.

Production of pig iron and ferroalloys in 1935 amounted to 21,163,896 gross tons, valued at $358,797,163, f.o.b. furnace, compared with 13,256,932 tons, valued at $204,056,320, reported for 1933, the last preceding census year. The total for 1935 is made up as follows: Pig iron and ferroalloys made in blast furnaces and consumed in steel mills and foundries under the same ownership as the blast furnaces, or under affiliated ownership, 17,543,478 tons, with an assigned value of $290,356,718; produced for sale, 3,620,418 tons, valued at $68,440,445.

The total 1935 production, 21,163,896 tons, includes 389,241 tons of blast-furnace ferroalloys, the corresponding tonnage for 1933 being 234,021. In addition, ferroalloys are made to some extent in electric furnaces. This production in 1933 amounted to 123,155 tons. The corresponding figure for 1935 is not yet available but will be given in the final report of the current census.

Convention Calendar

Jan. 7-11—American Engineering council. Annual meeting in Washington. F. M. Feiker, 744 Jackson Place N. W., Washington, is secretary.

Jan. 11-15—Society of Automotive Engineers. Annual meeting at Book-Cadillac hotel, Detroit. John A. C. Warner, 29 West Thirty-ninth street, New York, is general manager.

Jan. 12—Mining and Metallurgical Society of America. Annual meeting in New York. Percy E. Barbour, 90 Broad street, New York, is secretary.

Jan. 14-16—Institute of Scrap Iron and Steel. Ninth annual convention at Netherland Plaza hotel, Cincinnati. Benjamin Schwartz, 11 West Forty-second street, New York, is director general.

Jan. 25-27—American Society of Heating and Ventilating Engineers. Annual convention at Hotel Statler, St. Louis. A. V. Hutchinson, 51 Madison avenue, New York, is secretary.

WINDOWS of WASHINGTON

WASHINGTON

THE steel industry, with many others, should be particularly interested in the 1936 industrial mobilization plan promulgated through the co-ordinated efforts of the war and navy departments for the purpose of outlining the measures considered necessary to meet the supply requirements of armed forces in the event of a major emergency. The report has just been made public.

The national policy of maintaining and equipping a relatively small army and providing limited war reserves makes peace time industrial planning for a major war effort an essential phase of national defense, it is pointed out in the report. Of course, the objective of the plan has been definitely to ascertain what supplies are needed, and where and how soon they may be procured at the lowest cost to the government, with a minimum disruption to normal conditions.

Master Plan for War

This mobilization plan, known as the plan of 1936, has not been revised since 1933. Secretary of War Woodring has been greatly interested in the development of this industrial plan, not only because it will assist in the orderly procurement of supply requirements of the army in war, but also in view of the heavy responsibility in connection with industrial preparedness for war placed by the national defense act.

The new plan is in effect a master industrial mobilization plan setting forth the principles and policies that should govern in the co-ordination of American industry in the support of the military effort, and is reinforced and extended by supporting plans within the respective departments for procurement of the various materials required in war. Co-ordination between the two military departments is achieved through the agency of the army and navy munitions board.

The master plan provides for national industrial controlling agencies under civilian direction, the principal one being the war resources administration, which follows closely the war industries board which was developed and used so successfully during the World war. The war resources administration under the proposed plan will have broader powers and wider jurisdiction. Other national administrations provided include: War trade, to govern imports and exports; a war finance control commission, to assist in financing war production of munitions; a price control commission, and others as may be found necessary under war developments.

The planning branch of the office of the assistant secretary of war and the planning offices of each of the army supply arms and services are particularly active in determining the war requirements of the army, both finished items and raw materials, surveying sources of supply and matching existing production facilities to specific war needs.

Strategic and critical raw materials are receiving special consideration. Standardization of equipment has been a continuous study and development, and the chief of staff of the army in his recent annual report states that "standardization is an essential not only for efficiency but to conteract the mounting cost of production."

To support the revised plan and give it a legal basis, a proposed legislative bill is included in the plan itself to provide the necessary industrial controls to be utilized in war. These controls include price fixing, commandeering, power to buy and sell, priority, conservation measures and others.

SCAN LABOR MIGRATION

Announcement was made here last week by Secretary of Labor Perkins of a special investigation of migratory labor to be made in accordance with a resolution passed at the last session of Congress directing the secretary to report on "the social and economic needs of laborers migrating across state lines."

In view of the fact that the congress made no appropriation for this work it is being conducted in co-operation with the department of agriculture, public health service, resettlement administration, social security board and works progress administration. Within the labor department particular attention is being given to this investigation by the children's bureau, employment service, and bureau of labor statistics. N. A. Tolles of the latter bureau is in charge of assembling the material.

It is reported that many local agencies are furnishing information which would otherwise be inaccessible because of limited resources available for the investigation, according to Miss Perkins. This is just another place in which congress asked for an investigation but neglected to make financial provision for it.

BERRY MAY BE ON WAY OUT; CONFERENCE GOT NOWHERE

The Berry council for industrial progress meeting perhaps can be better appraised now than during the sessions.

One of the things that perhaps typifies the conference more than anything else is the fact that in the front row of the open session on the first day sat a Washington man who is the proprietor of a shoe repair shop. He joined the council during the conference and as far as big business is concerned he typifies it for the council.

Whatever else the Berry proponents can say no representative of big business attended the council meeting or took any part in it.

Following the meeting Major Berry announced to the assembled newspapermen that a correlating committee would meet here at once to go over the resolutions and committee reports and prepare legislation in accordance with the action of the council. This legislation will either be sent direct to the President or forwarded to congress through Mr. Roosevelt. The course has not yet been determined.

The thought is still playing around

in the minds of industrially minded Washingtonians that the first chance the President gets he will either abolish this council or make an effort to place Major Berry in some other position and put another man at the head of this industrial work.

Of course when he went on the air following the conference, Major Berry offered to resign, but he did it with his tongue in his cheek.

"Of course, I fully understand," said the major, "that there are those who previously declined to join us because they disliked the President; and also because they disliked representation of organized labor. I realize that. They had nothing against me. I was a nice, kindly sort of a person. I went through the NRA and tried to compose their differences and help them. They disliked the President, and they disliked organized labor.

"Now they don't dislike the President, if we are to read the newspapers. They want to co-operate. But in order to co-operate with the federal government, the President must get himself a new co-ordinator.

"Well, if it helps to save their faces, and rather than to abridge the furtherance of this program of national understanding, which means national patriotism and national protection—well, my friends, I am not so vain as to want to be co-ordinator and thereby abridge progress. I am no office seeker. I wouldn't take a public office of any kind within the gift of the President that paid a dime. That is the record. I am delighted to be able to be free."

If the President should take the major at his word, the latter would be very sad because there is nothing that he likes better than personal publicity which he has been getting through the means of the council and its activities. However we shall see what we see—and perhaps in the near future.

FREIGHT SURCHARGES TO STAY, IS GENERAL BELIEF

Much interest is shown in what decision the interstate commerce commission reaches as the result of arguments last week dealing with the extension after Dec. 31 of the emergency freight rate surcharges.

Questions asked last week from the bench by members of the commission indicated that the decision probably will be close. There is every reason to believe, however, that the surcharges will be allowed to continue for a time.

The railroads asked the commission that the emergency rates be allowed to stay in effect until the commission finally disposes of the general freight rate increase which has been applied for by the roads. Hearings in this case will begin Jan. 6 and it is believed that it will be six or eight months before the commission has finally adjudicated this case. That means, if the commission gives the roads what they asked for, that the surcharges will remain in effect for six to eight months.

It was admitted by representatives of the railroads that the surcharges have been bringing in about $10,000,000 per month during recent months. Shippers' representatives said that if the surcharges are continued in effect they will change to truck transportation.

MACHINERY EXPORTS ARE HIGHEST IN FIVE YEARS

Exports of industrial machinery from the United States in October were valued at $16,003,332, the highest monthly volume since June, 1931, and 36 per cent above the October, 1935, shipments valued at $11,778,274, according to the machinery division, department of commerce.

The 36 per cent increase recorded in the October trade was distributed over most machinery lines.

Exports of power-driven metal working machinery amounted to $3,083,006 compared with $3,276,152 in October, 1935. Compared with October, 1935, exports of lathes increased to $538,459 from $302,176; of vertical boring mills and chucking machines to $384,240 compared with $69,222; of thread cutting and automatic screw machines to $323,599 from $236,116; of vertical drilling machines to $71,969 from $7,512; of gear cutting machine to $245,177 from $128,110; of drilling machines to $226,503 from $116,594; of sheet and plate metal working machines to $328,031 from $115,357; and forging machinery to $127,036 from $68,604. The shipments of grinding machines, rolling mill machinery, and foundry and molding equipment declined, it was stated.

The 10-month total value for industrial machinery exports this year aggregates $140,489,759 which was $18,622,079 above the 12-month total for last year, according to the commerce department.

TO DISCUSS IDLE CENSUS

Secretary of Commerce Roper at his press conference last week said that he expects to discuss the unemployment census with the President when the latter has time. In the meantime the executive committee of the Roper business advisory council has some recommendations under consideration on this census to be forwarded soon to the President and altogether it looks as though the administration would do something about this matter soon.

Secretary Roper refused last week to answer newsmen on their questions as to what he thought of the Berry industrial conference and its results. He said that the President needs to get advice from all sources during these times and he could not be drawn out with reference with the work the Berry organization is said to be doing.

JAPAN SEEKS MALAYA ORE

That Malaya may replace Spain as the chief source of Japan's requirements of iron ore is indicated in a report to the commerce department from its Singapore office. A Japanese syndicate, it is pointed out, has just secured an option on an area in the country which is reported to be rich in iron ore. While the option has not yet been exercised, early developments are expected in view of the Spanish situation, the report states.

Japanese interests have for some time past been exploiting iron ore deposits in British Malaya on a large scale, particularly in the states of Johore, Trengganu, and Kolanuan, according to the report.

All of the iron mines in Malaya are at present stated to be operated by Japanese interests. Exports of iron ore from Malaya increased 1,500,000 tons in 1935 from less than a million tons in 1932, statistics show.

COERCION CHARGES FALL

Charges of political coercion by employers in the steel industry were dismissed last week by the senate campaign committee. Complaints against Timken Roller Bearing Co., Canton, O., Carnegie-Illinois Steel Corp. and Jones & Laughlin Steel Corp. at Clairton and Aliquippa, Pa., were dismissed for lack of evidence in substantiation. Inquiry into a number of further complaints was ordered.

The committee held that urging by an employer for his employes to vote in a certain way does not constitute coercion.

FEDERAL SPENDING GROWS

Expenditures of the federal government in the fiscal year 1935 amounted to 12.8 per cent of the national income compared with 13.6 per cent in 1934, according to the National Industrial Conference board, New York.

The decline in the percentage figure was due entirely to the increase in the national income during the period, not to reduction in government spending. Federal expenditures increased slightly, rising from $6.8 billion in 1934 to $6.9 billion in 1935. The national income, however, advanced from $50.3 billion in 1934 to $53.8 billion in 1935.

The Conference board's study of the ratio of federal expenditures to national income covers the fifteen-year period from 1921 to 1935. In 1921 government expenditures amounted to 9.3 per cent of income.

Editorial

Industry's Platform Needs Interpretation, Emphasis

IN PRESENTING the keynote address at the recent Congress of American Industry, C. M. Chester, president of the National Association of Manufacturers, submitted a 12-point program embodying his own views on industry's obligations to the public. It reads as follows:

1. Industry must accept its responsibility for the national welfare as being an even higher duty than the successful operation of private business
2. Industry must continue to fulfill its obligations to the public in making better goods at lower cost, thus raising the standard of living and keeping the door of personal opportunity open.
3. Put every possible employable in manufacturing industry back to work.
4. Keep its own house in order, exposing its policies at all times to public scrutiny.
5. Stand four-square against monopoly.
6. By its actions engender growing confidence on the part of workers.
7. Invite increasing public understanding of industry by telling the facts.
8. See that workers, management and investors, according to their contribution, share fairly in the proceeds of manufacturing.
9. Help to create economic security for all, preserving as well the opportunity for the individual to attain his own greater security.
10. Zealously live up to its responsibilities and insist that all other factors of our economic life, including labor organizations, be made equally responsible.
11. Make its co-operation available to government in a constructive manner at all times.
12. Join other business groups in studying the depression in order to minimize or avoid another one.

Insofar as the 12 points, considered collectively, breathe the spirit of co-operation by industry with governmental and other agencies in attempting to solve national economic and social problems, the program is admirably fitted to the requirements of the day. The almost universal approval with which the document was received by the editorial writers of the nation's daily press shows conclusively that public opinion will warm up much more readily to a conciliatory statement of this kind than to the critical and antagonistic utterances which went forth from last year's annual meeting.

But within the councils of industry itself, the platform should be examined critically before it is accepted finally as a guide for industrial executives. Some of the 12 points need interpretation. A few statements in which vital problems are referred to in an off-hand way should be strengthened for emphasis.

As an example of the need of interpretation, consider the first point, wherein it is stated that "industry must accept its responsibility for national welfare as being an even higher duty than the successful operation of private business." Acceptance of this responsibility by industry as a whole, acting with other responsible agencies, is desirable. No one will quarrel with the statement when it is thus interpreted.

But it would be unfortunate, indeed, if industrial executives were to believe that their higher duty, within the restricted limits of their individual functioning in conducting the business of their companies, is responsibility for "national welfare" instead of responsibility for administering the affairs of their companies successfully. The greatest contribution an executive, acting individually, can make to the advancement of the national welfare is to make profits for his company. With industry generally in a profitable state, then industrial leaders, acting collectively for industry, can join with the leaders of agriculture, commerce, finance and government in seeing that the resources and facilities made available by profits are utilized properly for social and economic betterment.

Failure of Professional Labor To Assume Share Of Responsibility Will Antagonize Public

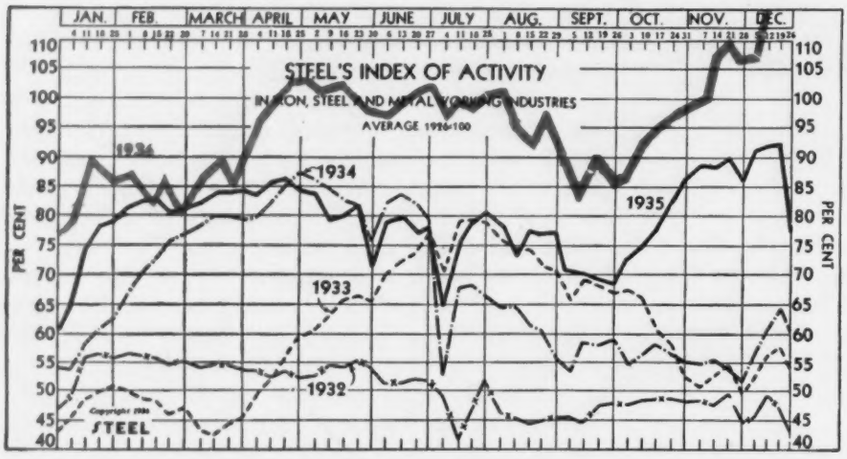
The need for emphasis in some of the 12 points can be illustrated by No. 10. Industry is urged to "zealously live up to its responsibilities and insist that all other factors of our economic life, including labor organizations, be made equally responsible."

All fair-minded persons will agree that this point is deserving of more emphasis. One of the strangest features of the new deal program of federal administration has been the cordial manner in which the President and his advisers have allied themselves with the professional union labor movement without making the union leaders or their organizations responsible for their acts. At the outset in 1933, it would have been possible for the President to say to union labor leaders that he would assist them if they would get their house in order and would prepare to accept responsibility. He failed to do this. Likewise, there has been no visible effort on the part of union leaders to clean up the racketeering element or to effect a type of organization capable of accepting responsibility.

This failure is not unknown to the American public. It would not be difficult to prove to the average fair-minded citizen that the failure of union labor to bear responsibility jeopardizes the success of points Nos. 2, 3, 5, 6, 8 and 9 in the program.

Through interpretation and emphasis, industry can utilize a program such as that proposed by Mr. Chester to good advantage.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries gained* 5.7 *points to* 114.1 *in the week ending December* 12:

Week ending	1936	1935	1934	1933
Sept. 12	83.1	70.1	58.7	69.1
Sept. 19	90.1	69.4	58.1	68.2
Sept. 26	86.2	68.5	59.3	66.9
Oct. 3	89.0	73.3	54.7	67.4
Oct. 10	93.4	74.9	56.4	66.0
Oct. 17	95.5	77.4	58.2	60.9
Oct. 24	97.1	82.4	56.3	58.0
Oct. 31	99.1	86.4	55.0	52.3
Nov. 7	102.1	88.4	54.9	50.7
Nov. 14	107.9	88.8	55.2	52.6
Nov. 21	109.9	90.9	54.4	55.4
Nov. 28	105.8	86.0	51.9	49.7
Dec. 5	108.4†	91.7	56.6	52.6
Dec. 12	114.1*	91.8	60.6	56.0

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL). *Average for* 1926 *equals* 100, *weighted as follows: Steel rate* 40, *and car loadings, power output and auto assemblies each* 20.

Business Expansion Revives Talk of Controlling "Boom"

BUSINESS volume is expanding so positively that the talk of controlling a boom, which thus far has been closely confined to a small group, soon may become general throughout finance and industry.

Further increases in the rate of industrial activity would be welcome and in themselves would not seriously concern those who fear a runaway situation. It is the combination of mounting business volume and sharply rising prices that would cause authorities to attempt to put on the brakes.

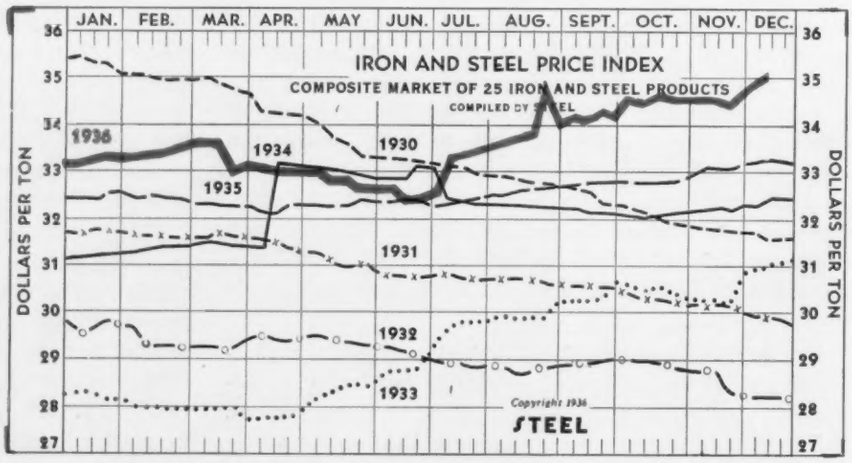
As the end of 1936 approaches, the price situation will bear watching more closely than at any time in seven years. During the past week substantial advances in nonferrous metals, steelmaking scrap and some other commodities showed clearly that a strong upward trend in prices is in the making. Commodity price indexes have moved upward rather sharply in the past few weeks.

Industrial activity is at the highest point of the year. STEEL'S index stands at 114.1, which exceeds all figures since August, 1929. The major factor in the sharp increase from the previous week was the rebound in automobile production, following interruptions caused by labor difficulty.

The steelmaking rate was up to 77.5 per cent of capacity. All of the estimators of the weekly rate, including STEEL and the American Iron and Steel institute, were low in their November figures compared with the institute's calculated rate for the month.

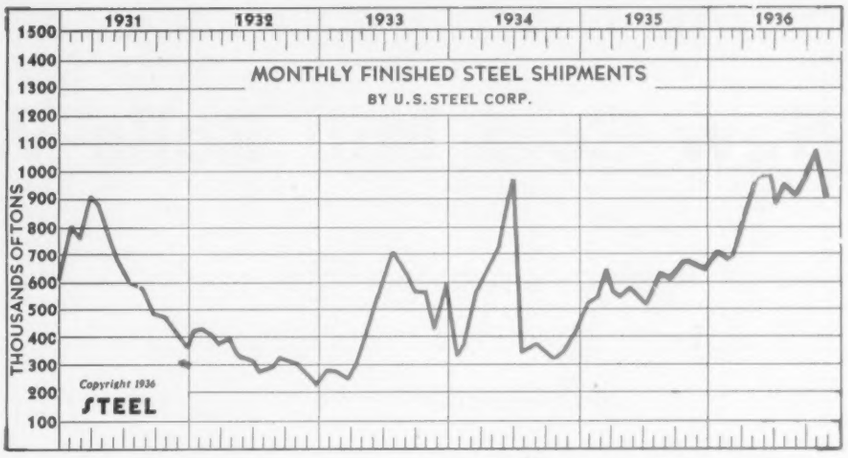
Electric power output leaped to a new high of 2,278,303,000 kilowatt hours, which may be exceeded in the week ending Dec. 19. Revenue car loadings were near the 750,000 mark, indicating that freight traffic is resisting the usual downward tendency for December.

	1936	1935	1934
Dec. 12	$35.08	$33.32	$32.44
Dec. 5	34.99	33.30	32.25
Nov. 28	34.79	33.28	32.22
Nov. 21	34.59	33.17	32.18
Nov. 14	34.60	33.16	32.15
Nov. 7	34.60	33.16	32.15
Oct. 31	34.62	32.98	32.13
Oct. 24	34.66	32.85	32.12
Oct. 17	34.64	32.83	32.09
Oct. 10	34.60	32.86	32.09
Oct. 3	34.62	32.82	32.09
Sept. 26	34.19	32.83	32.13
Sept. 19	34.22	32.83	32.13
Sept. 12	34.10	32.81	32.14
Sept. 5	34.10	32.79	32.17



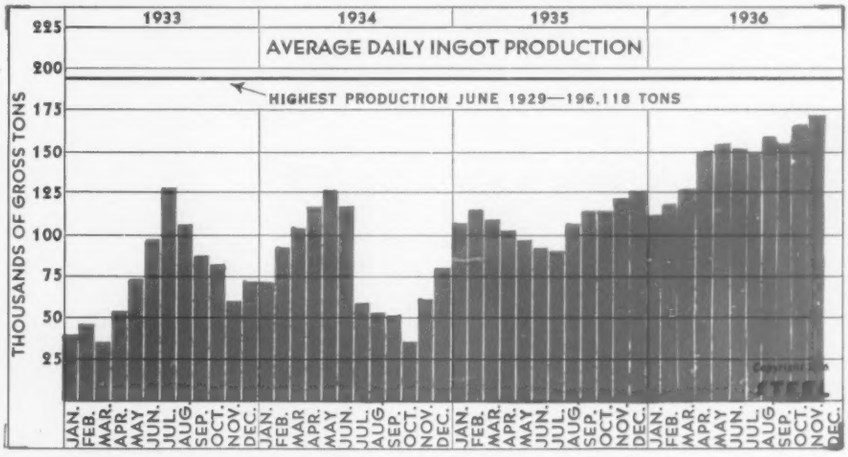
Steel Shipments Hit Highest November Total Since 1929

	Gross Tons		
	1936	1935	1934
Jan.	721,414	534,055	331,777
Feb.	676,315	583,137	385,500
March	783,552	668,056	588,209
April	979,907	591,728	643,009
May	984,097	598,915	745,063
June	886,065	578,108	985,337
July	950,851	547,794	331,777
Aug.	923,703	624,497	378,023
Sept.	961,803	614,933	370,306
Oct.	1,007,417	686,741	343,962
Nov.	882,643	681,820	566,119
Dec.	.....	661,515	418,630



November Daily Ingot Output Highest Since September, 1929

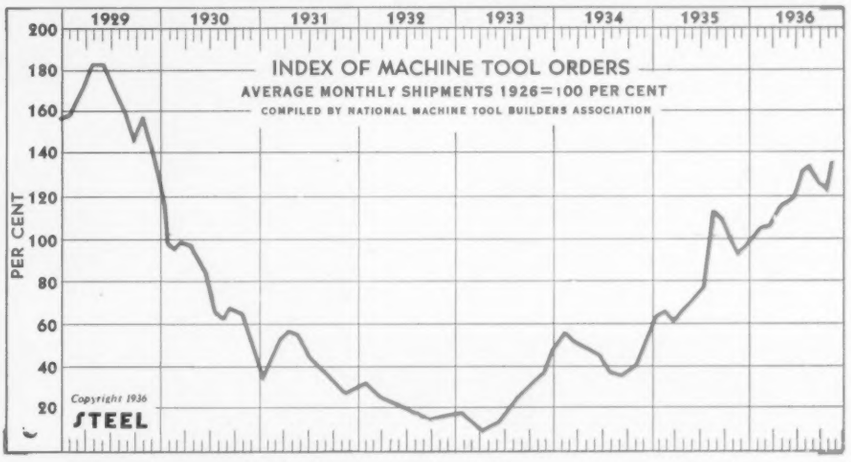
	Gross Tons		
	1936	1935	1934
Jan.	112,813	106,302	73,968
Feb.	118,577	115,595	92,164
March	128,576	110,204	103,646
April	151,625	101,562	117,443
May	155,625	97,543	125,907
June	153,263	90,347	117,672
July	150,874	87,224	59,578
Aug.	161,351	107,997	51,161
Sept.	160,043	113,000	50,759
Oct.	168,333	116,398	54,885
Nov.	173,496	121,170	61,947
Dec.	.....	122,936	78,570



November Machine Tool Orders Show Sharp Upturn

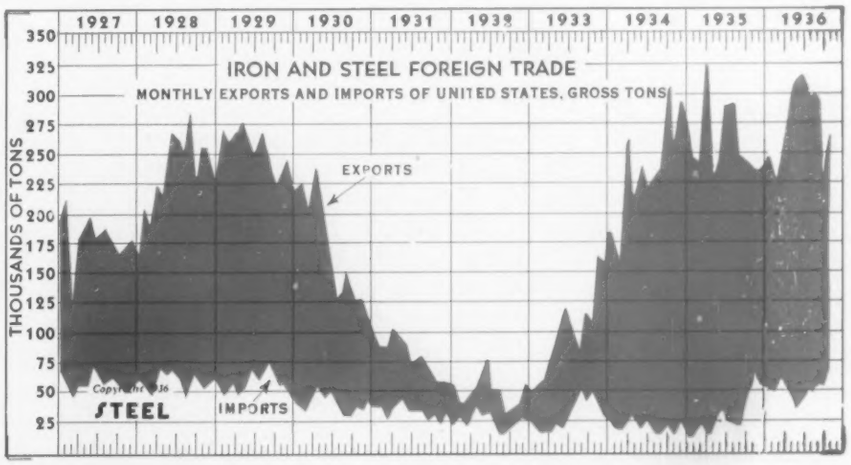
Three Months Average

	1936	1935	1934	1933
Jan.	102.6	61.3	56.5	18.3
Feb.	107.1	61.5	58.2	15.2
March	109.4	60.3	50.9	11.1
April	114.4	60.3	48.5	8.3
May	116.6	67.1	46.8	10.6
June	124.5	76.7	42.6	15.5
July	132.6	94.7	38.6	22.4
Aug.	135.5	112.2	37.1	27.9
Sept.	132.0	108.5	37.4	30.9
Oct.	127.5	102.9	40.5	33.3
Nov	134.0	93.8	44.2	38.0
Dec.	.....	99.9	54.1	51.0



October Steel Imports Show Slight Gain

	1936		1935	
	Imports	Exports	Imports	Exports
Jan.	50,489	241,564	22,784	262,740
Feb.	43,358	213,802	28,905	228,537
Mar.	56,720	264,337	21,409	323,035
Apr.	49,621	301,987	28,866	205,336
May	59,391	314,950	47,719	286,598
June	59,910	294,951	33,208	286,333
July	47,940	296,738	31,894	296,782
Aug.	60,697	295,341	32,312	247,312
Sept.	59,993	235,571	53,158	244,419
Oct.	64,509	261,882	59,569	238,358
Nov.	.....	.....	56,637	205,242
Dec.	.....	.....	53,678	239,268



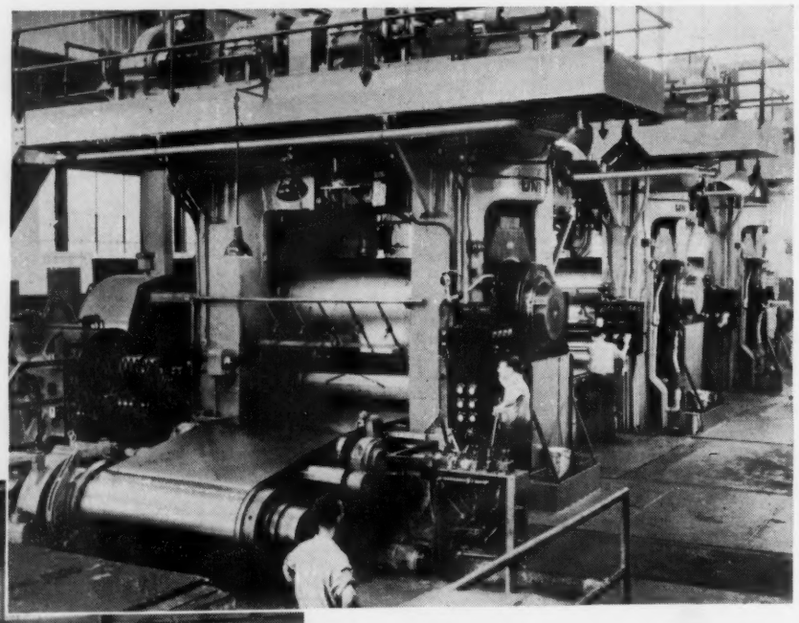
New Cold Mill Rolls Wide Sheets

Modern in both appearance and operation, this new cold reduction unit reflects extensive planning in its conveniently located control and recording equipment and in its minimized handling operations

IN RESPONSE to the needs of the automobile industry for wider sheets the American Rolling Mill Co., Middletown, O., decided late in 1935 to build a wide cold reduction mill at its East Works plant, that city. This also involved the widening of the hot strip mill and the expansion of certain other processes. Although the cold reduction mill has been operated satisfactorily for several months, the necessary auxiliary equipment only recently has been completed.

This new cold reduction unit embodies many features of interest to those engaged in the manufacture of iron and steel sheets. Coils are rolled on the continuous hot strip mill, a development pioneered by the company several years ago, and carried to the new cold reduction mill on an underground gravity conveyor. Maximum width of the coils is 74 inches, while the average gage is 0.090-inch.

The first operation in the cold reduction of sheets is the coil building unit. The equipment in this building, approximately 42 x 110 feet, consists of a decoiler and shear,



DELIVERY side of new cold reduction mill, a strip being rolled shown above. Strip passes through four pickling tanks and two rinse tanks in the continuous pickler at left

pinch rolls, a 1200-kilovolt ampere flash buttwelder, a flash trimmer and spacing machine and a re-coiler. The decoiler unwinds the coils, the shear uniformly trims the ends, the pinch rolls push it into the welder where it butts against the sheared end of the strip preceding it, and in that position the weld is made. The flash from the weld is then removed, and the strip recoiled. A maximum of six coils, averaging 200 feet each, may be so joined making a continuous strip 1200 feet in length. Coils are transported by means of a gravity conveyor to the coil storage building. This building is placed at right angles to the coil build-up unit and is approximately 82 x 176 feet.

Pickling Is Continuous

Next in line comes the continuous strip pickler. Each coil passes through a decoiler, shear and stitcher. The front end of each coil is then stitched to the rear end of the preceding one. Pinch rolls then push the strip into a looping pit from which it is carried upward into the pickling tanks, the entrance to which is approximately 9 feet above the floor level. This is necessary because the bottoms of the tanks are located 4 feet above the floor level for convenience in making inspection and repairs.

The strip now passes through four 50-foot steel pickling tanks which are rubber and brick lined, then through two 30-foot rinse tanks equipped with hydraulic sprays of 300 pounds pressure and finally through a hot air dryer. As it passes from tank to tank it runs over rubber rolls set in roller bearings. Acid is fed into the pickling tanks, and the temperature of each is recorded on a pyrometric chart. Pinch rolls on the far end of the strip pickler pull the strip through the various tanks. As it emerges from the dryer a tachometer records the speed of the strip. All tanks are equipped with automatic recording temperature indicators and controls.

The stitched portion is now removed and the welded strip passes into a re-coiling and oiling unit where the original lengths are recoiled and oiled; then it passes by means of a gravity conveyor to scales where the coils are weighed. From here they go into storage in a combination coil storage, shearing, temper rolling and box-annealing building 80 x 1080 feet. This building parallels the cold reduction mill building. All coils are delivered to and from the cold reduction mill by gravity conveyors when needed for processing. It is not necessary to store coils near the cold mill where they might interfere with operations.

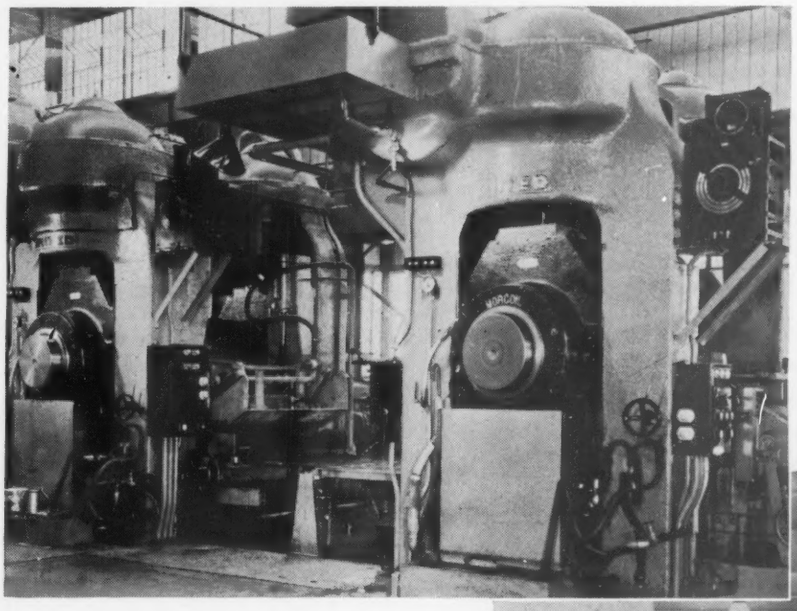
The cold reduction unit represents a remarkable engineering achievement. Housings, rolls, bearings, screwdowns, and mill drive sizes were determined after a very careful analysis of all the factors involved in the cold reduction of wide strip. The unit consists of a decoiler, a sticker, three 4-high roll stands, and a coiler.

Rolls Well Lubricated

Each roll stand has two working rolls, 19 inches in diameter, and two back-up rolls 49 inches in diameter, and both 80 inches in length, capable of rolling a strip 74 inches in width. Back-up rolls revolve in oil lubricated bearings, working rolls are mounted in roller bearings and back-up bearings are lubricated from a central system which is completely protected by a light and bell signal to insure a continuous supply of oil.

Both the work rolls and backing up rolls are balanced by means of hydraulic cylinders operating from a self contained hydraulic system connected with cylinders located in the roll chucks. Rolls are changed by a portable motor operated roll changing rig.

Screwdowns are double motor operated through a combination of spur and worm gears which are roller bearing mounted. The speed of both screws is synchronized by means of a magnetic clutch connect-



SIDE view of the mill stands, above, showing convenient location of electrical controls. At right is a partial view of the annealing department, showing seven of the 18 annealing furnaces

ing the two motors. Electric controls for mill motors, screwdowns and the like, are all located on the mill housings convenient to the operators.

Each stand is independently driven from 1500-horsepower direct current motors, 300 to 600 revolutions per minute, having a two-to-one speed range on full voltage through separate gear reduction and mill pinion units. The drives consists of separate primary drives from the pinion stands, each pinion stand being equipped with interchangeable pinions which are connected to the work rolls by universal type spring balanced spindles. The speed range is as follows: No. 1 stand, 200 to 400 feet per minute; No. 2 stand, 250 to 500 feet per minute; No. 3 stand, 300 to 600 feet per minute.

Mill motors are supplied by a synchronous motor generator set made up of a 5750-horsepower motor connected with two 2000-kilowatt, 600-volt direct current generators.

All three stands are equipped with a roll coolant system located in the basement under the pinion stands and designed to maintain or vary roll contour by means of a suitable fluid applied to roll and strip surfaces. The coolant system has capacity to deliver 200 gallons of fluid to each stand, or a total of 600 gallons per minute.

Strip Annealed in Coils

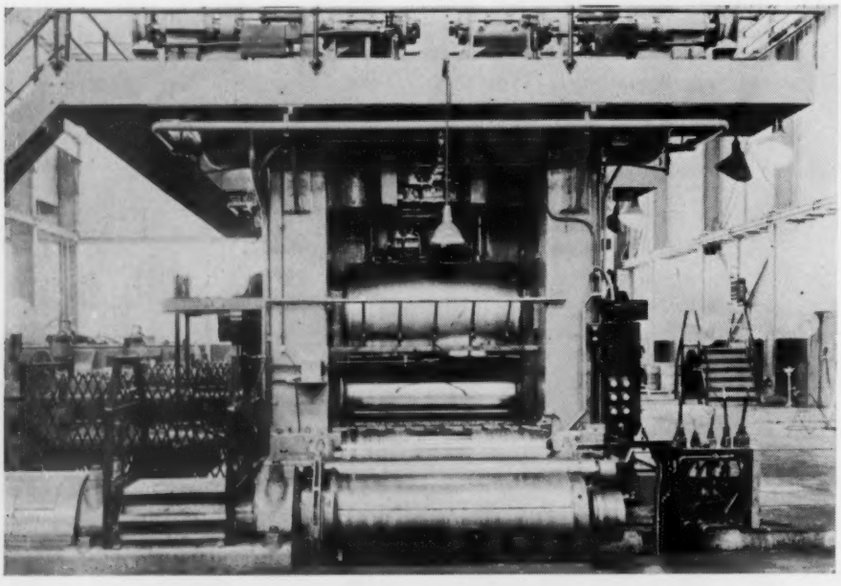
On the delivery end of the mill is located the coiler. The coiled strip now passes back into the coil storage and annealing building. Most strip sold in coils is annealed and processed by a coil temper mill, 14 and 27 x 58 inches, and then into a tight coiling machine. That which is to be marketed in sheet form is taken to another decoiler, where it is side trimmed, cut to length by a flying shear, oiled and automatically piled. The drive on the side trimmer is automatically controlled so there is no back pull on the shear. Scrap from the trimmer is fed into a machine which forms it into balls.

In the annealing department 18 bell-type box annealing furnaces are employed. The sides of the inner covers are made of special heat resisting alloy steel which greatly lengthens their service life. Ten of the furnaces have capacity of one pile of sheets; in each of six furnaces two piles can be heated; in each of the remaining two furnaces four coils can be annealed. All are pyrometrically controlled, while proportioning valves control the flow of fuel and air. Pyrometer recording instruments are located in a small adjacent building, with all recordings at 5 points. After annealing, the sheets are transferred on an electrically driven lorry car to another part of the plant where the 2-high temper rolls are located.

Location Is Well Planned

In designing this new addition the company's engineers have spared no effort to make the new unit efficient and economical. Special attention has been given to the locating of equipment, the placing of controls convenient to the operators and other points which make for efficiency but are sometimes overlooked. All buildings are well lighted and properly ventilated. Because such a high degree of precision is required in the cold reduction of sheets, the machinery has been painted in pleasing colors to encourage the operating personnel to take a greater interest in properly maintaining and operating the equipment throughout the mill.

In order to furnish wide coils for the cold reduction mill, it was also necessary to widen the continuous hot strip mill completed in 1929 so coils 74 inches wide could be rolled. This mill originally consisted of 11 stands—four 2-high and seven 4-high. In order to roll thinner gages, a twelfth four-high stand was added. This reconstruction work was carried on without interrupting production, which represents an unusually difficult accomplishment.



Delivery side of the new mill, showing the coiler in the foreground. Strip coming from the delivery end of the mill is taken either to the annealing pit or to decoilers to be run through the shear

Diesel Engines—Text on High-Speed Power Units

High-Speed Diesel Engines, by L. H. Morrison; published by American Technical Society, Chicago; cloth, 243 pages, 5½ x 8¼ inches; published by American Technical Society, Chicago; supplied by STEEL, Cleveland, for $2.50, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This is a practical text on high-speed diesels, including instruction on fuel-injection and combustion systems, frames and cylinders, running gear and construction details of various models of the diesel engine and their applications to industry and transportation.

The purpose of the author is to acquaint the public with the diesel operating at 800 to 2200 revolutions per minute, by far the greater part of the motors turned out in this country being for operation at these high speeds. The text is not technical and the author has sought to be practical and capable of benefiting those interested in this revolutionary source of power.

Publish Results of Tensile Tests on Refractories

Published as research paper RP923, a treatise on Young's modulus of elasticity, strength and extensibility of refractories in tension has been released by the national bureau of standards, Washington. The paper was written by R. A. Heindl and L. E. Mong.

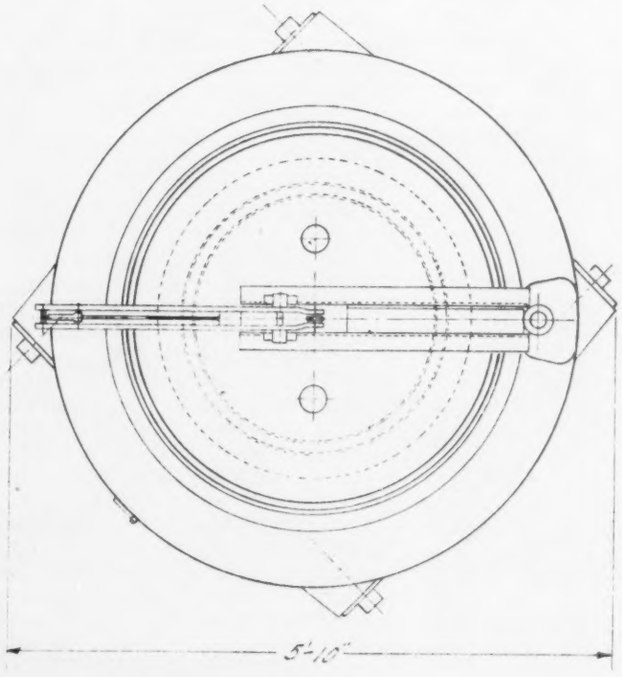
These qualities were determined at ordinary temperatures upon the following materials in tension: Sixteen brands of fireclay brick with a wide variance in silica content, representing the stiff-mud, dry press and hand made methods of forming; one brand each of silica brick, chrome, forsterite, 60 per cent alumina, 80 per cent alumina and of mullite. A comparison is made of the tensile properties obtained parallel to the 9-inch dimension as against those obtained parallel to the 4½-inch dimension.

Steel Forgings Tempered by Recirculation

BY C. F. CLARK
Detroit City Gas Co., Detroit

GAS-FIRED furnace for tempering steel forgings by recirculation as installed by Vincent Steel Process Co., Detroit

THE tempering or drawing of steel is done at temperatures ranging from about 350 degrees Fahr. to 1200 degrees Fahr. Forgings are usually heated within a comparatively narrow range, from 950 to 1150 degrees Fahr. In general practice it is customary to allow the parts to soak in the furnace for varying periods of time after they have reached the recommended temperature, but repeated experiments have shown that this is not necessary. Once the piece has reached the correct temperature it may be taken from the furnace, thus speeding up production. It is of paramount importance, however, that the correct temperature be maintained in the furnace; otherwise it would be exceedingly difficult to determine when the parts themselves had reached the temperature desired.

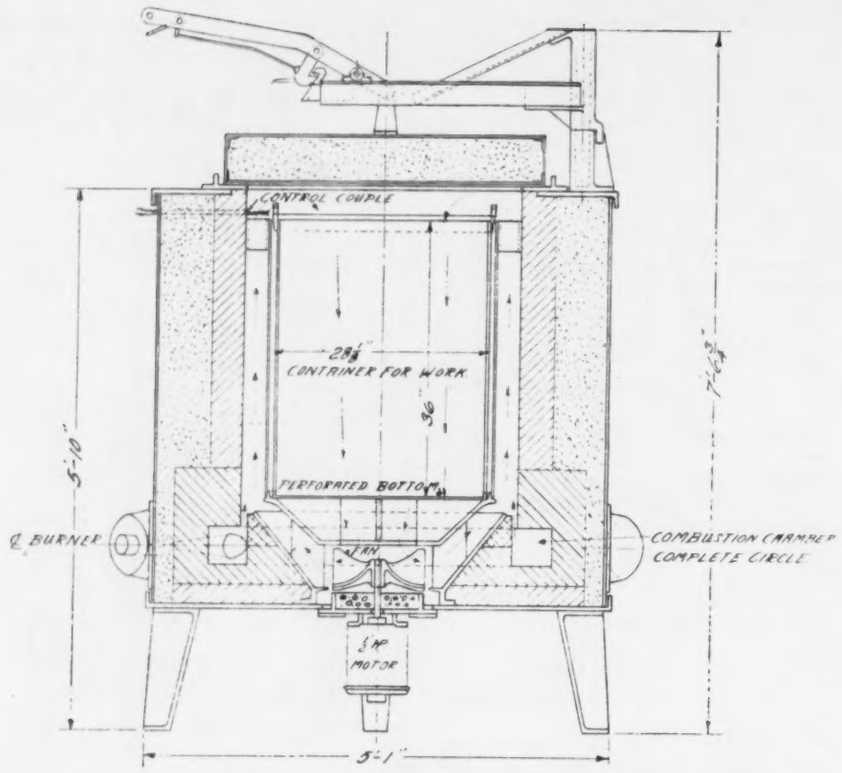


SCALE drawing, top view, of air tempering furnace in which the heating is done by products of combustion

Heat by Convection Suitable

At temperatures above 1200 degrees Fahr., heat transfer by radiation is more effective than by convection; under 1200 degrees the reverse is true. There is a certain amount of overlapping but in general the above temperature is considered the dividing line. When considering heat by convection, the modern recirculating type of oven or furnace stands out far ahead of other heating methods.

Usual method of heating by recirculation requires the use of an external heater, into which air is drawn by suction or pressure and intimately mixed with the hot combustion gases from the burner, which heat it very rapidly. This heated air, together with the products of combustion, then enters the oven or furnace through suitably



SECTIONAL view of air tempering furnace, showing details of construction and position of gas burners, recirculating fan and work container under operating conditions

placed ducts and diffuses quickly to all parts of the heating chamber. After giving up part of its heat, the mixture of air and burned gases returns through another series of ducts to the heater, where the cycle is repeated. Ventilation to the outside is kept as low as possible, just sufficient to allow for the combustion gases produced by the burner itself.

Install New Furnace

A gas-fired furnace for the tempering of steel forgings by recirculation, with a unique method of applying this heating principle, has been installed recently at the Vincent Steel Process Co., Detroit. This company does commercial heat treating on a large scale and for the past few years has pursued a policy of expansion in the use of gas for heat treating. The new tempering furnace, built by the Industrial Heating Equipment Co., Detroit, is used for the tempering of various automotive forgings, such as axle shafts, clutch parts, yokes, and the like.

The furnace is cylindrical in shape, with an outside diameter of five feet and a height of four and one-half feet, not including the height of the legs. The steel furnace shell is lined with refractory brick and insulating fire brick and is fitted with an insulated swinging cover. The work is contained in an alloy steel cylinder, 28 inches in diameter by 36 inches in height, open at the top and perforated at the bottom to allow circulation of the heated gases through the charge.

The combustion chamber is an annular-shaped compartment at the bottom of the furnace, made of fire brick and insulating refractory brick, surrounding the conical-shaped fan well. The fan itself is of special cast alloy designed to operate under a high static pressure and is direct-connected to a one-half horsepower motor under the furnace. Around the top of the combustion chamber is a narrow slot through which the products of combustion are siphoned by the hot gases discharged from the fan. These hot gases pass upward between the work container and the inner wall of the furnace, then down through the charge and back to the fan intake. Heat is supplied by four tunnel-type gas burners firing tangentially around the combustion chamber. A McKee low pressure inspirator supplies the gas-air mixture to the burners. Excess combustion gases, over the amount required for recirculation, are vented through small openings in the under side of the furnace cover.

A Leeds and Northrup automatic recording control unit actuates a Minneapolis-Honeywell proportioning valve in the air line to the inspirator. The control thermocouple is located near the top of the heating chamber in the combustion gas stream just before it enters the work container. The unique features of this furnace are that the heating is done by products of combustion rather than by heated air and that these gases do not re-enter the combustion chamber. The advantages of using products of combustion rather than circulated air for heating are several. In the first place, the specific heat of these gases is higher than that of air, thus requiring a smaller volume to carry the same amount of heat; second, the combustion gases will not support combustion and will vaporize quenching oil without its taking fire, thus eliminating the necessity for washing the parts before they are placed in the furnaces; third, the furnace need not be made air-tight, as there is always a slight pressure from the combustion of the gas fuel, preventing infiltration of air; fourth, the control of temperature is closer than with other heating methods due to the instant response of gas fuel to the control instruments.

Cycle of Operations

The work container holds approximately 700 pounds of steel forgings. The load is lowered into the furnace, the cover swung into place, and the gas turned on. The heating cycle varies, depending upon the work heated and the temperature to which it is to be raised. The work comes to heat in from 30 to 40 minutes and is held at the operating temperature for periods varying from one-half hour to several hours. The temperature difference between the top of the load and the bottom varies inversely with the volume of gases circulated; the special fan used in this furnace will deliver a volume of about 1200 cubic feet per minute of heated gases, assuring rapid and uniform diffusion of heat through the work. On account of the construction of the work container and the method of circulating the hot gases, temperature uniformity is obtained with small loads as well as when the container is full.

Data From 48-Hour Run

Total elapsed time, hours	48
Net operating time, hours	35
Operating temperatures, degrees Fahr.	950 to 1150
Total loads	25
Total net weight, pounds	17,673
Total dead load, pounds	2,250
Gross load, pounds	19,923
Total gas consumption, cubic feet	14,830
Gas cons. per lb. product, cu. ft.	0.84
Average gas cons. per hour, overall (530 B.t.u. per cubic foot), cubic feet	310

ADVERTISING PAGES REMOVED

Materials Handling

Handling Methods Employed In Assembling Steel Desks

BY C. W. HAMILTON

A MATERIALS handling system, in the final analysis, is the co-ordinating force which makes operations in the various manufacturing departments of any plant dovetail into a working order. In an organization which makes over 4000 items of office equipment, it is natural that this necessity of securing cohesion should develop many problems entirely related to the movement of parts and finished products from one place in the plant to another. The recent expansion of the company's line of steel furniture, and the addition of a new line of Advance steel desks, brought to the forefront again the necessity of attaining a continuity of production and a reduction of waste in handling so that the finished products might attain the highest possible quality at prices that would be economic. In attaining this end, considerable reliance was placed on continuous overhead chain conveyors for carrying semifinished stock through enameling ovens and other such operations, and on speed-controlled flat slat conveyors for assembling operations and for transportation to the finished stock or shipping departments.

The main tasks imposed on these conveyors are best described by the accompanying illustrations. For example, Fig. 1 affords a very good view of the continuous chain conveyors, showing the method of suspending desks from the trolley hooks. This particular view is made more understandable by explaining that after the desk pedestals receive their prime coat, the conveyors carry them through huge drying ovens 100 to 150 feet long and operated at temperatures of 250 to 400 degrees Fahr.

Assembly Line Shown

In Fig. 2 is illustrated the manner in which the various drawers, pedestals, drawer pulls and other parts of a finished steel desk are assembled "all on the move" in the plant of the Globe-Wernicke Co., Cincinnati. In Fig. 3, the completely assembled finished products, after passing a rigid final inspection, are transported on the slat conveyor into the storage department.

Most of the steel used in the manufacture of office equipment comes direct from the mills in large flat sheets that vary in quality and thickness depending upon the service expected of them. Powerful shears cut these sheets into blanks of different sizes. These shears are so accurate that pieces are sheared to limits of 1/64-inch on all dimen-

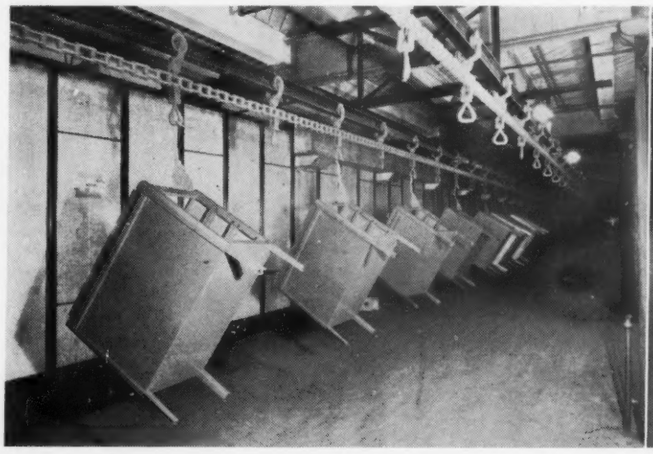


Fig. 1 (left)—After desk pedestals receive their prime coat, conveyors carry them through drying ovens 100 to 150 feet long operated at 250 to 400 degrees Fahr. Fig. 2 (right)—This conveyor acts as an assembly line and on it workmen add the drawers and other essential parts of the desks. They may work from the floor of the factory or ride along on the conveyor

sions, with edges parallel and square. It is necessary for many of the blanks to be punched or notched to provide holes for screws, bolts, roller studs, guide rods, label holders and other parts. Corners or edges also are notched to allow for joining flanges and return bends. Often both punching and notching are done in one operation on presses.

Some parts are then bent or shaped on presses capable of exerting from 50 to 500 tons pressure. The moldings for desks, binding edges, shapes for suspension slides and other such items are rolled in long lengths from coiled strips on machines designed especially for this purpose.

After the metal sheets have been cut, punched, notched and formed into desired shapes, the pieces are assembled. Spot welding is used to a great extent, particularly for assembling cases, drawers and parts. When it is necessary to weld outside corners to close up seams and joints for better appearance, or to improve strength and give greater rigidity to the product, it is customary to use oxyacetylene welding. For certain operations on long joints, such as edges of doors and partitions, the work is done by arc welding.

Rough spots and sharp edges

(*Please turn to Page* 74)

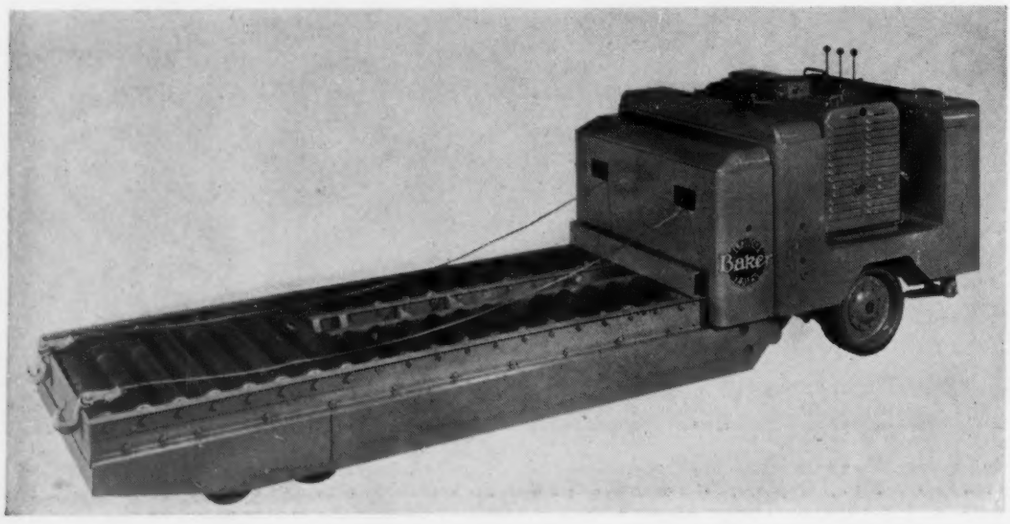
Fig. 3—Here the finished steel desks are moving to finished stock storage or to shipping department. These desks have a special crinkle "Duro-Velv" finish and hard-tempered Masonite top

Conveyor Elevating Truck Handles Steel from Mill

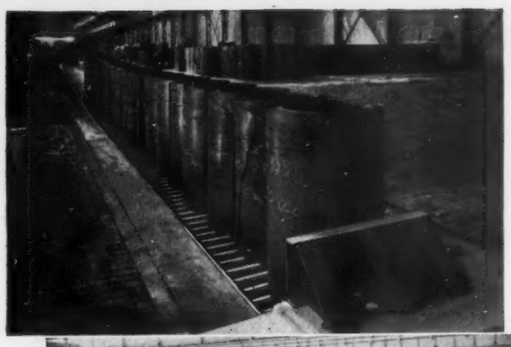
INCREASING applications of special equipment for doing specific materials handling operations are characteristic of the present practice in the steel industry. Notable among the developments of recent months have been several styles of industrial trucks of heavy-duty type, which combine the idea of a sturdy, flexible load carrying transportation unit with a self-loading platform to expedite movements of loads on and off the trucks. The principle in each machine is similar, a combination of truck and some form of conveyor.

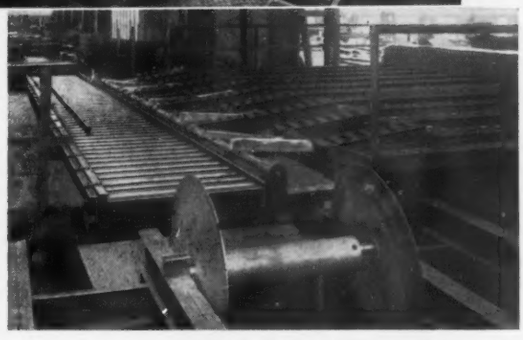
The most recent addition to equipment of this type is an electric industrial truck which embodies a power-driven roller conveyor built on the platform of the machine. The truck, introduced by the Baker-Raulang Co., Cleveland, and shown in an accompanying illustration, is almost 18 feet long overall and the platform is 10 feet long by 50 inches wide and 20 inches high to the top of the conveyor rolls in the lowered position. An elevating feature provides adjustment of the conveyor to the level of run-out tables at loading and discharge points.

Capacity of this unit is 10 tons and the machine weighs 16,000 pounds. All six wheels of the truck are equipped for power steer, a slight movement—approximately 2 inches—of a steering controller handle in either direction operating the motor to actuate the steering. Travel, lift, conveyor, winch and steer are individually powered by separate motors. Another feature is an electrically-driven double drum whose cables are hooked around the package of steel sheets to hold it on the conveyor in secure position. The conveyor may be driven while the platform is being raised or lowered.



THIS 10-ton capacity storage battery unit combines an elevating truck with a power-driven roller conveyor built on the platform. Various movements are controlled by separate motors





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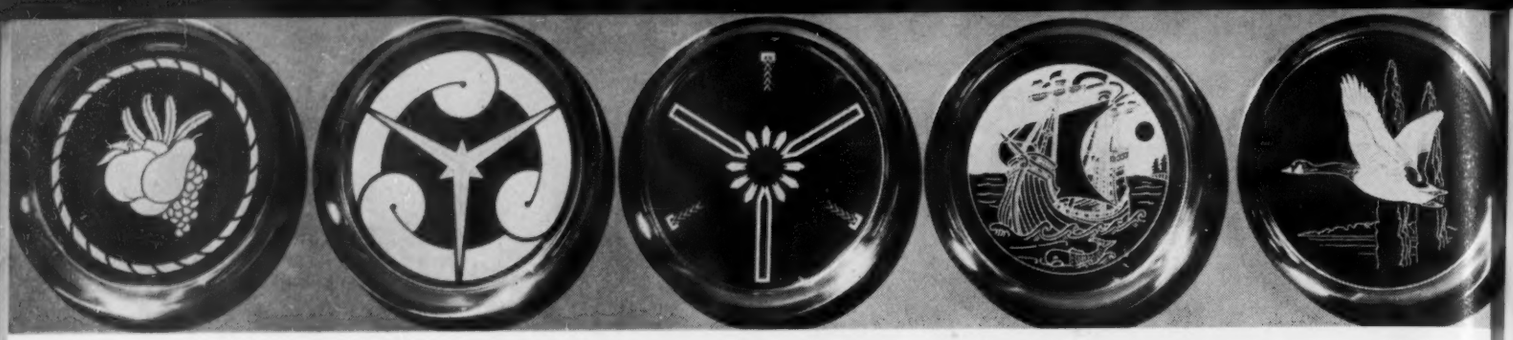


SURFACE TREATMENT AND FINISHING OF METALS

Etched Stainless Steel Furnishes Modern Medium for Skill of Artists and Craftsmen

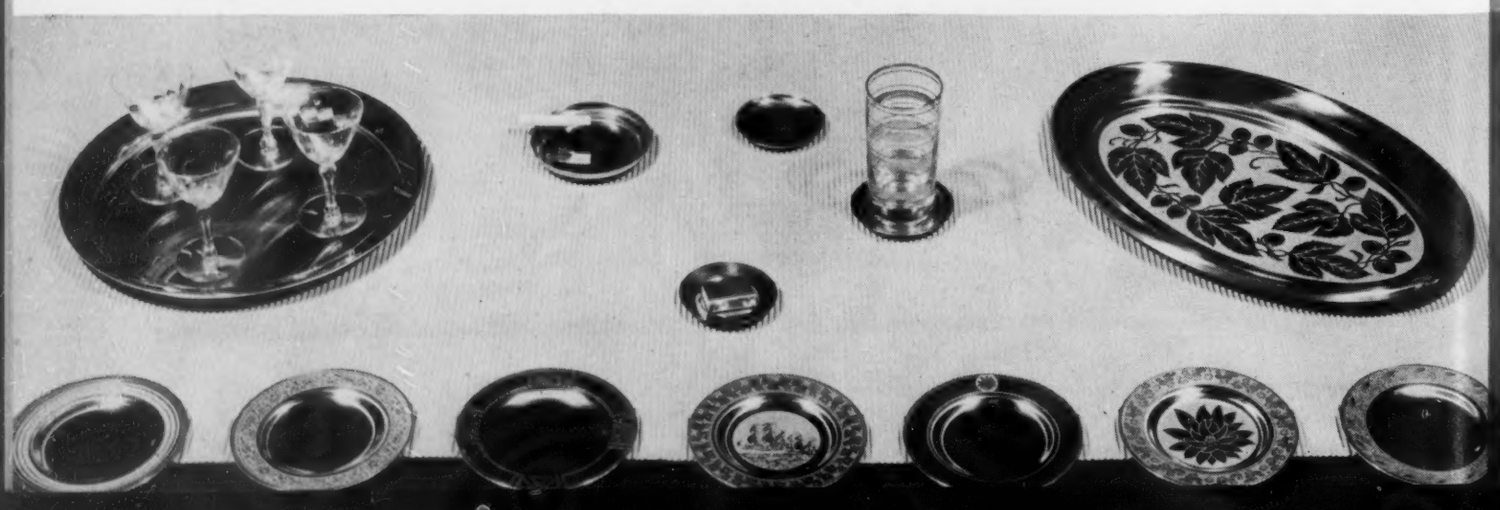
DEVELOPMENT of stainless steel has furnished a new medium for artists and craftsmen to shape into permanent examples of their creative genius and skill. This metal, because of its desirable physical properties, lends itself readily to the will of the artisan and requires none of the protective measures, so necessary to many other metals, to preserve its strength and beauty. First introduced as a corrosion resistant metal for industrial purposes, its use has spread to many other fields, notably architecture and related arts.

Outstanding among the newer applications of stainless steel is its use in the manufacture of serving ware. Trays, platters, water pitchers and similar ware, which are beautiful examples of the etchers' art are now being placed on the market. As will be noted in the accompanying illustrations the hard, shiny metallic appearance which would normally be expected of polished steel has been softened by the satin finish of the etch and the polished portions furnish a pleasing contrast with the etched design.

While the appearance of etched stainless steel platters and pitchers makes them suitable for formal ware, their low cost and long life should appeal also to stewards of clubs, hotels and institutions where crockery breakage is always an item of considerable expense. There is no plated metal to wear off and the high finish of the polished parts can be maintained with a minimum of effort.

The C. H. Hanson Co., Chicago, manufacturer of stainless steel serving ware, has applied modern production methods to the art of etching and forming this type of product.

Improved rolling practice has enabled steel mills to offer stainless steel sheets with a wide variety of surface finish. This company found stainless steel of 18 per cent chromium and 8 per cent nickel composition, rolled to standard No. 4 finish, best suited to their require-



ments. It was found that this steel required no polishing or buffing after etching and forming. This was desirable because these operations would tend to destroy the contrast between the etched and polished portions of the finished ware. Medium gages (22 to 20 gage) have been found most suitable for this work.

The designs used on serving ware have been carried out in a modern trend in keeping with the modernity of stainless steel. They are first made up as black and white drawings of sufficient size to allow accurate working of fine detail. They are usually hand drawn. The completed drawing is then photographed to the size of the article to be etched on a glass negative.

ETCHING of stainless steel is carried out in tanks as illustrated here

Standard Printing Methods Used

The designs are transferred to zinc lithographing plates from the negatives in accordance with standard lithograph practice. These plates are mounted in specially adapted flat bed printing presses which imprint the design on the steel. The stainless steel stock receives no preliminary treatment other than insuring the surface to be printed is clean and free from grease. The design is printed in reverse, that is, the parts to be etched are left exposed. The ink is a metal printing ink. While it is still wet, it is dusted with powdered asphaltum and rosin. Excess powder is blown off with air, then is baked, forming an acid resisting enamel.

The backs and edges of the steel are then coated with asphaltum paint by means of a brush. These surfaces are also allowed to dry. The steel is then ready for the etching bath.

The coated steel is hung in bakelite racks and submerged in the etching bath for a definite length of time. The composition of the bath and the time of etching, of course, are trade secrets of this company. However, usual practice is to use a ferric chloride solution; modified solutions containing hydrochloric acid are also used. It usually requires about thirty minutes to etch to a depth of 0.003-inch in a ferric chloride solution. Concentration of the solution must be such that action will not be too rapid and cause "undercutting." At the same time it must etch rapidly enough to allow economic production. Concentration of ferric chloride solutions is controlled in most shops with the aid of a hydrometer. Modified solutions containing two or more acids require other methods of control. Etching solutions must be agitated to bring fresh solution constantly in contact with the steel. This is usually done with compressed air, though in some cases motion of the steel in the solution is considered sufficient.

Passivity Restored

After etching the plates are thoroughly washed with water to remove all traces of acid. Etching solutions for stainless steel have a reducing action which destroys the "passivity" of the metal. Passivity is the natural characteristic which gives stainless steel its desirable properties and while the steel will regain this characteristic of itself, the process is slow and most manufacturers prefer to accelerate it and guard against any contingencies. This is done by dipping the washed parts in a solution of nitric acid and washing again in water.

Etching is then completed and the steel is ready for fabrication. The asphaltum coating is removed with gasoline and the steel blanks are transported to the forming presses.

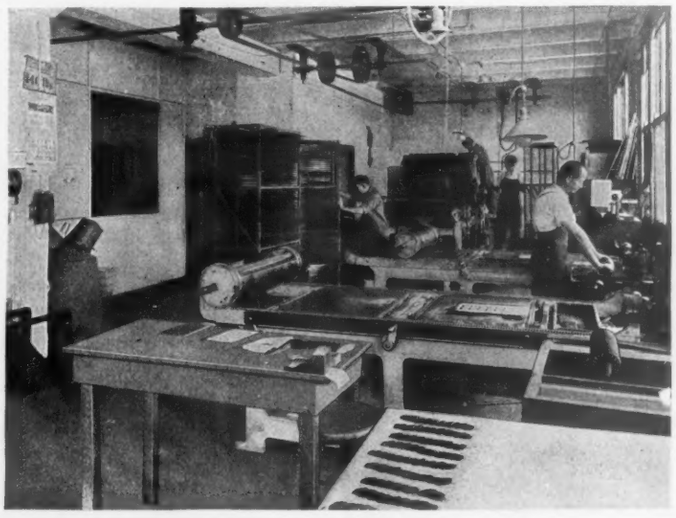
Special Dies Required

Specially hardened, oversize alloy steel dies mounted in oversize presses are required to form stainless steel ware. Very careful handling is required during the forming operations since there are no subsequent polishing operations to remove scratches or other scars which might be inflicted. Consequently both dies and metal must be free from dirt and other foreign material.

One feature of the drawing and forming processes is worthy of special mention. If the etched design appears on parts of the ware which are stretched or otherwise deformed in forming it will be distorted. To correct such distortion, allowance is made in the original design so that the finished product has a design which is in true proportion. Considerable ingenuity on the part of the designer is required to make proper allowances for distortion in each case.

In some cases colored enamels are used to fill the etched portions of the ware although this use is usually confined to ornamental plaques. On serving ware the use of additional decoration usually is not considered desirable but in some cases black nickel plating has been found to be very satisfactory. This imparts a deep black color to the etched portions which stands out in excellent contrast to the polished portions.

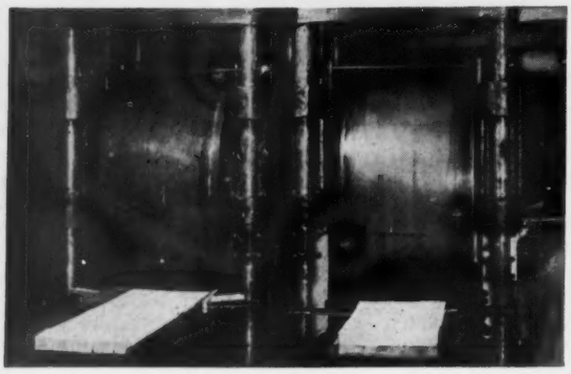
Etched name plates, panels and plaques are prepared by the same process outlined above for serving ware with the possible exception of the forming processes.



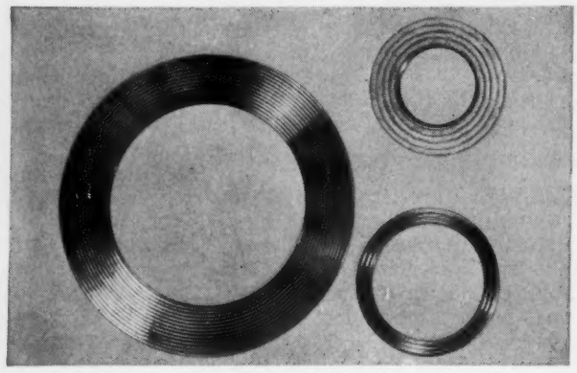
Designs to be etched are printed on steel in reverse on equipment illustrated here. Procedure is same as in case of lithographing on paper

COLD—HOT

enough to freeze fish — *as high-pressure steam*



FOR SUB-ZERO COLD—*Monel Metal strip conveyor belts for quick freezing of fish fillets and Sea Loaf in a frosting tunnel at 40° below zero. Although the fish gets hard as marble, the Monel Metal belt must withstand constant flexing and vibration. Photo by courtesy of J. E. Carroll Co., Lowell, Mass., who designed and built these machines for General Sea Foods Corp., Gloucester, Mass.*



FOR HIGH TEMPERATURE—*In steam pipe gasket service, Monel Metal is stronger at elevated temperatures than steel pipe and flange metals. It is also tough, rustproof, and free from oxide scale. The serrated type, made from heavy Monel Metal sheet is used for steam pressures up to 1200 lbs. per sq. in. and 750° F. Photo by courtesy of Goetze Gasket & Mfg. Co., New Brunswick, N. J.*

Monel Metal retains its strength, toughness and corrosion resistance over a wide range of temperatures

LOW TEMPERATURE PROPERTIES OF ROLLED MONEL METAL ROD

	Tensile Strength	*Elongation*	*Red. of Area*	*Charpy Impact*
Monel Metal @ 70° F. (Room)	78,650 p.s.i.	51.5%	75%	216 ft. lbs.
Monel Metal @ –310° F. (Liq. Air)	117,600 p.s.i.	50.7%	75.3%	216 ft. lbs.

YOU know already that Monel Metal has certain properties industry cannot do without. You know it resists corrosion from most acids and alkalies. That it cannot rust. That it is stronger than structural carbon steel, and tougher.

But DID YOU KNOW how little difference heat or cold makes to the mechanical properties of Monel?

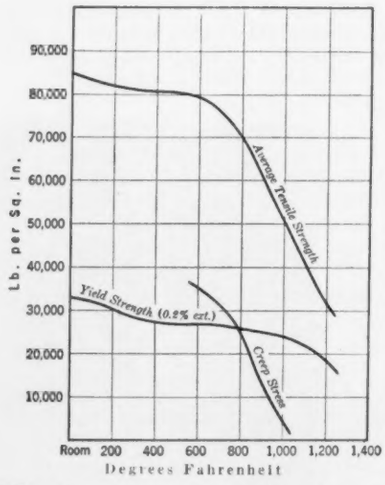
The tables shown here help you to see the answer.

Look at what happens in cold. At 70° F. the Charpy value for Monel is 216 foot pounds; for .30 carbon steel it is 33. But at–310° F. Monel's Charpy value is still 216; the carbon steel's value has shrunk to 2 !

In extreme heat–the tensile strength and proportional limit of Monel drop slowly. But they lose far less than do steel or bronze. Even at 800° F. Monel still has a tensile strength of 70,000 p.s.i.

Have you tried Monel on any of your jobs lately? Monel's endurance saves money for everyone who gives it a job to do. Write the Inco engineers, stating what problem you're up against. Address:

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET NEW YORK, N. Y.



Effect of temperature on Monel Metal. Creep-stress curve shows stress producing not more than 0.1% elongation in 1,000 hours at each temperature. Curves for Yield Strength and Average Tensile strength represent short time test strength at each temperature.

MONEL METAL

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

Atmospheric Corrosion Tests on Wire And Wire Products Begun by A.S.T.M.

IN THE country-wide series of atmospheric corrosion tests of wire and wire products, being carried out by the American Society for Testing Materials, with its committee A-5 on corrosion of iron and steel in direct charge of the work, there are almost eleven thousand (10,886 to be exact) test specimens involved. The specimens of plain unfabricated wire, barbed wire, wire strand, farm fence, and chain-link fence have been assembled at several of the eleven test sites and the remainder will be completed within the next few weeks.

This vast research program has two major objectives: First to obtain essential engineering information concerning the materials involved, and second, to assist in establishing national standard specifications for fencing, barbed wire and the other products which will afford consumers an adequate guide in purchasing the materials.

Field Data Is Only Source

In the absence of adequate artificial or accelerated tests for examining metallic coatings for merit in service, a knowledge of the field performance of metals and metallic coatings is of the greatest importance to the prospective user and the data from actual field tests are the only source of reliable information on which to base the requirements of specifications.

Economic consideration in general, dictate the undertaking of research investigations. The protection of metal against corrosion is one of the biggest problems that faces industry today, both from the technical and economic side. To make the proper decisions in selection of materials and types of coatings that will best meet a given set of conditions, the facts must first of all be established. It is believed the present investigations will give many of the desired facts. The facts must then be properly interpreted, both by individual engineers for their own specific problems and by the society from a somewhat more general viewpoint. Then with the facts known and properly interpreted, it will be possible to record the knowledge in the usuable form of standard specifications thus facilitating the economic procurement of metallic-coated products of various types to meet various conditions. Such specifications, as should be true of all such standards, are not to be thought of as fixed and unchangeable, but rather as temporary landings at which to rest, review progress and gather new energy for the further climb towards better things. The development of adequate specifications for metallic coatings is one of the important objectives of the present researches.

The present wire test program has been preceded by extensive long-time atmospheric corrosion studies involving bare (uncoated) iron and steel sheets and metallic coatings on various shapes. The first named tests, begun in 1916 involved iron and steel sheets of varying composition, and included observation of corrosion in various types of atmosphere (rural, industrial, salt air) and by immersion in various kinds of water (city, mine, saline). These tests so clearly demonstrated the value of long-time corrosion tests, conducted upon a co-operative basis by producer and consumer under the auspices of a neutral, impartial body, that committee A-5 planned a similar study of metallic coatings—principally of zinc but including also cadmium, aluminum, lead and copper—on (1) iron and steel sheets, (2) shapes, hardware, and tubular goods, and (3) wire and wire products exposed to different types of atmosphere. The first two parts of the investigation were started respectively in 1925 and 1929; the third is now beginning.

The program of atmospheric cor rosion tests of wire and wire products is a comprehensive one and provides for country-wide testing of wire and wire fence. This is much more extensive than the tests on sheets and hardware and shapes and has required considerably more time for its development. The tests in the general form as now being carried out were first announced and described in the 1934 report of committee A-5.

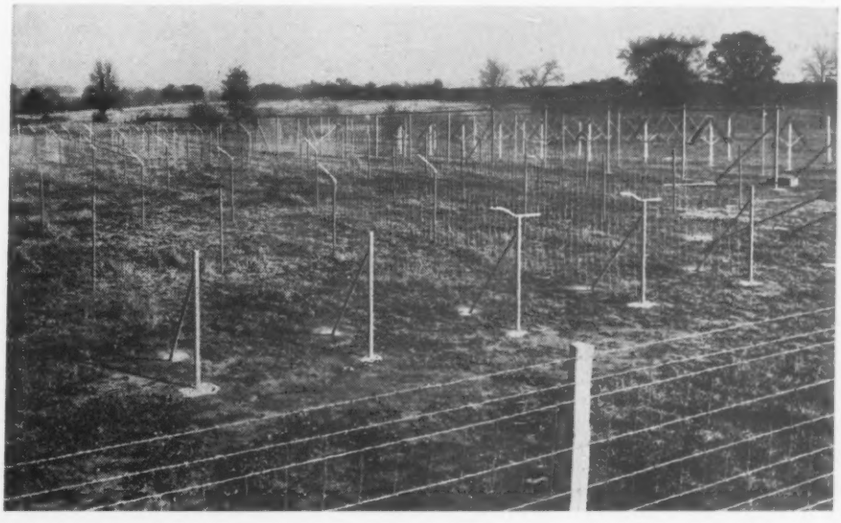
The zinc coatings have been applied by various processes. Range of weight of zinc coatings is from a very light weight, such as 0.20 ounces per square foot, up to about 2.5 to 3 ounces per square foot. It is to be noted that only comparatively recently has it been commercially possible to apply relatively heavy coatings of zinc on wire that would successfully withstand fabrication operations, and the present series of tests is believed to be the first comprehensive field study of such coatings.

The samples of copper-clad, lead-clad, and stainless-steel wire and fencing will give valuable comparative data.

Colleges Provide Test Sites

Eleven test sites in all have been chosen. Eight are being provided by the agricultural experiment stations of seven universities which are furnishing these sites (approximately 100 by 200 feet) without charge for a period of twenty years, enclosing them, providing labor and accessory materials for erection of the samples, keeping the site in good condition, and providing services of a resident engineer who will participate in the inspections. The American Society of Agricultural Engineers is co-operating.

Materials have been furnished by a total of fourteen manufacturers without charge, to the committee's specifications as to base metal, gages of wire, kinds and weights of coating, and other provisions, using reg-



This test yard erected at Purdue University, Lafayette, Ind., is typical of many being erected in other sections of the country for this nation-wide program

U-S- CENTRIFUGAL PUMP PACKING

1 STAYS SOFT AND PLIABLE 2 DOES NOT CUT SHAFTS 3 LESSENS WEAR 4 REQUIRES FEWER ADJUSTMENTS

WHERE THE WHOLE JOB DEPENDS ON PACKING

Shown here is a battery of centrifugal pumps that supply thousands of gallons of water per hour to the breaker of a great coal mining company. On U. S. #193 Packing — a coil of which appears on the right of photo — falls the task of keeping these pumps in efficient, 24-hour operation.

SPEED PRODUCTION... CUT COSTS...FIT EVERY CENTRIFUGAL PUMP JOB WITH SCIENTIFICALLY DESIGNED U. S. #193 PACKING!

STRONGEST long fiber asbestos yarn... exclusive U. S. Rubber plaiting process ...proper density...thorough lubrication... and graphiting! These are the physical elements that proof U. S. #193 against water, steam, oil, weak acids, and brine...that prevent hardening with age or burning out under high heats and speeds.

But into each coil and ring of U. S. #193 are woven other elements that bear no price tag, appear on no specification sheet. Unseen and intangible, these are the vital ingredients that cut costs, eliminate waste, speed production, and safeguard the investment of the purchaser. They are the matchless skill and special knowledge of the great company of our scientists and engineers... the experience of three decades of research and craftsmanship in the manufacture of packings for industrial uses... the constant sample testing of U. S. Packings in laboratory, plant, and field... and an unchanging adherence to the ideal of quality.

That is what we mean when we say that U. S. Packings have built into them Service Beyond Price and Specifications.

SERVICE BEYOND PRICE AND SPECIFICATIONS

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United States Rubber Company

United States Rubber Products, Inc., New York, N. Y.

ular commercial manufacturing practices. The weight-of-coating ranges have been arbitrarily chosen and purposely held to close limitations and do not necessarily individually represent any manufacturer's commercial product. On the other hand, the entire range of coatings covered by all weight groups as a whole are designed to include a sufficient range of coating weight to furnish the useful corrosion resistance data desired and permit the selection of the most economical weight of coating for a given service condition.

Samples Remain Unknown

Methods of collecting, testing, marking and shipping of the samples to the test sites are so designed that the identity of the producer of a particular sample shall always remain unknown. This step has been considered essential to the success of the tests, since they are designed to yield data evaluating only such factors as kind and weight of coating, base metal, gage of wire, and the like. By so doing, the committee avoids the testing of commercial brands of fabricated wire products, as such.

The following tests will be made on samples taken from all material received:

Base Metal—Complete chemical analysis; determinations of tensile strength and percentage of elongation (each value reported is the average of three determinations).

Coatings—Weight and uniformity of coating; determination of microstructure; wrap test for adherence and ductility of coating.

These extensive tests, which it is planned to have made at the national bureau of standards, will determine the original properties of the materials being tested, which will be published as the initial ratings.

Inspection of the test material will be made by an inspection committee of men experienced in this type of work, whose services and expenses are contributed. All samples will be periodically rated for their resistance to corrosion. The plain unfabricated wire will be tested at seven periods (the time depending upon the rate of corrosion of individual wires) for effect of corrosion upon tensile strength and ductility.

Significance of Tests

For years there has been a demand for acceptable standard specifications for metallic coatings of such products as are included in the A. S. T. M. atmospheric corrosion tests, but adequate reliable data upon which to prepare such specifications have been lacking. This in a word, was the primary need that led to the inauguration of the extensive field tests.

There has been observed a pronounced leaning toward the theory that the region in which a metallic coating is exposed is of much greater importance than slight differences in the protective value of coatings, and it has been concluded that the greatest value per dollar expended in corrosion work by the society can be obtained from actual outdoor exposure in a wide variety of locations. An organization such as the A. S. T. M. is in a peculiarly advantageous position to conduct investigations of this type, involving exposure for many years of identical samples at widely separated locations, continuous supervision of the tests, and responsibility for recording the data, drawing fair and unbiased conclusions and publishing current and final reports.

Questions To Be Answered

It is anticipated that these tests will give reliable information on such questions as the following:

Does a particular metal or a particular coating have superior resistance to atmospheric or other corrosion?

What is the relative performance, expressed quantitatively, of different metals and metallic coatings in different locations?

What is the relation between thickness of metallic coating and its service life in different locations?

What is the effect, if any, of the method of applying coatings, the purity of the coating and its continuity, on the protection afforded against corrosion?

What are the essential properties of a metal or a metallic coating, or of the two in combination, that govern performance?

Where does the economic balance lie between the heavier or more expensive types of coatings and their life expectancy under given service conditions?

Some of these questions are already being answered in the tests of metallic-coated sheets and hardware, but only partly so; it is clear that the tests have not run long enough to determine the life of some of the coatings satisfactorily. The tests on wire and wire products, which are probably the only systematically planned ones in this country covering such a wide range of coatings and exposure conditions, will not only give much needed information on these products but also valuable supplementary information which in conjunction with the data on sheets and hardware should give a well rounded knowledge of the corrosion-resistant properties of the various types of metallic castings.

A special committee was appointed to institute the wire test program. This committee, the personnel of which follows, planned the tests and arranged for the preparation and collection of the specimens and the tests of the samples which will be published as the initial ratings.

F. F. Farnsworth, *Chairman*, Bell Telephone Laboratories Inc.

A. P. S. Bellis, J. A. Roebling's Sons Co.

J. D. Conover, American Zinc Inst. Inc.

F. M. Crapo, Indiana Steel and Wire Co.

F. C. Elder, American Steel and Wire Co.

W. H. Finkeldey, Singmaster & Breyer.

W. M. Floto, American Steel and Wire Co.

H. F. Hanks, Pittsburgh Steel Co.

H. W. Riley, Dept. of Agricultural Engineering, Cornell University.

H. E. Smith, Consulting Engineer.

R. U. Blasingame, Dept. of Agricultural Engineering, Pennsylvania State college.

C. L. Warwick, secretary-treasurer, A. S. T. M., is director of the tests and H. E. Smith, consulting materials engineer is assistant director of tests and in charge of the assembly and erection of the test racks.

An inspection committee is to be appointed to superintend the periodic observations of the specimens and correlate the data obtained from the facts.

Industry Approves Revised Coated Abrasive Practice

Current revision of simplified practice recommendation R89, Coated Abrasive Products, has been accorded the required degree of acceptance by the industry and is to become effective Dec. 30, 1936, according to an announcement by the division of simplified practice, national bureau of standards. The revised recommendation will be identified as simplified practice recommendation R89-36.

Originally effective in 1928, the recommendation was revised in 1932 and established simplified lists for flint, emery coated and other kinds of coated abrasives. Lists include type of backing, size of sheet, type of coating and grade number for each class of goods. The various kinds of products are indicated as being regularly made by some or all manufacturers and carried in stock by them, or as non-standard items which may be discontinued when no longer in demand for special purposes.

Until printed copies are available, mimeographed copies are available from the division of simplified practice, national bureau of standards, Washington.

United States Rubber Products Inc., New York, N. Y.

YOUNGSTOWN

Fleet of trucks built by
The Kranz Automotive Co.
St. Louis, Mo.

30,000 MORE CUPS OF COFFEE *each trip!*

Use of YOLOY, in bodies alone, reduced the dead weight of the five trucks shown above by 3260 lb., thereby increasing the pay-load by 652 lb. per truck. At the same time the life of the bodies was increased due to their greater strength and their increased resistance to corrosion.

YOLOY'S excellent hot and cold forming properties plus its outstanding weldability makes it the ideal metal for truck chassis and body construction.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices - - YOUNGSTOWN, OHIO

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Furnished in sheets, strip, plates, bars, shapes, manufacturers' and welding wire, seamless and electric weld pipe.

YOLOY YOUNGSTOWN STEEL

HIGH-TENSILE STEEL
YOLOY

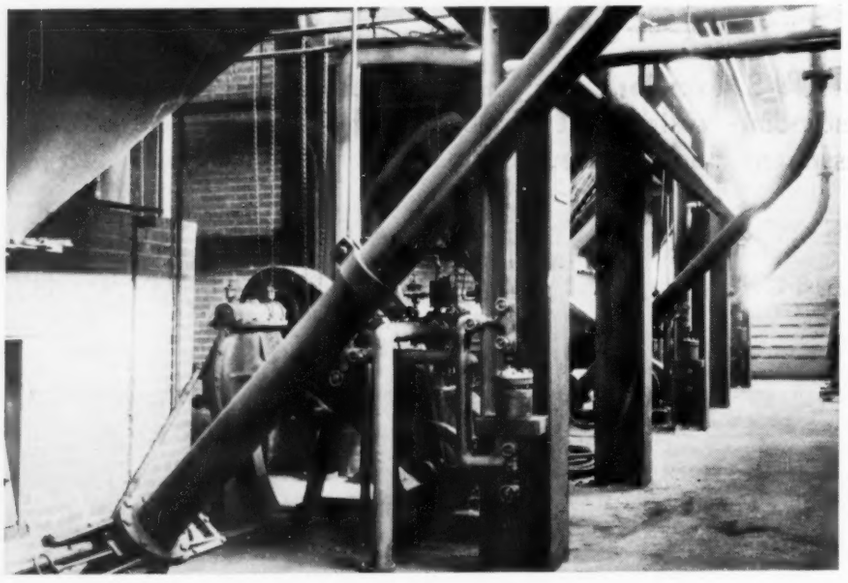
Modern Steam Engines Effect Savings In Industrial Plant Operation

BY F. J. VONACHEN
Troy Engine & Machine Co.
Troy, Pa.

IF GOOD plant heat balance and low operating cost are to be secured, the same steam should be made to do double duty, namely, generate power and produce heat. If the amount of power and heat produced are both just sufficient for the requirements, there is perfect heat balance. Perfect heat balance is difficult to obtain in practice, but to secure the best heat balance and lowest operating cost, it is essential to work as close to the perfect heat balance as possible.

Steam can be made to do double duty by passing it through a prime mover and using the exhaust for heating and processing in place of live steam. That type of prime mover should be selected which will give the required power, and at the same time an amount of exhaust steam that will not be excessive for the heating load.

For many steel and metalworking plant installations, the modern steam engine best meets the requirements: first, because the low steam rate remains low throughout the entire speed range and even at high back pressure which is sometimes necessary to obtain high temperature in the process or heating steam, so that the amount of exhaust best meets the requirements and a good plant heat balance results; second, because the modern steam engine is a simple, reliable machine, requires practically no maintenance, is readily operated, even by inexperienced men, and is controlled easily. As this low water rate is maintained closely throughout the long life of the steam engine, the original plant heat balance also is maintained which is important if greatest saving is to be maintained during the life of the equipment. About 90 per cent of the heat originally in the steam is available in the exhaust for heating, so the power developed is really a low cost by-product.



Four steam engines driving stokers at a Great Lakes steel plant. Each is rated at 6 horsepower

Graphite Lubrication Used

Since some processes require steam free from cylinder oil, it is well to mention that many steam engines are being operated entirely satisfactorily today with saturated steam without oil cylinder lubrication. With the cylinder properly constructed and glazed by the use of beeswax and graphite, it may be operated without any lubrication except possibly the introduction of a slight amount of beeswax and graphite at infrequent intervals. A solution of colloidal graphite in distilled water, introduced into the cylinder by a special mechanical cylinder lubricator, also has been used with success. The graphite concentration is so low that it does not interfere with processing or heating even if these are in direct contact with the steam, and its effect on

boiler operation is considered advantageous.

Steam conditions offer no particular problem as the modern steam engines are suitable for a wide range of conditions—from 20 to 400 pounds pressure, from wet steam to 750 degrees Fahr. total temperature, from vacuum to 75 pounds and higher back pressure. There is no limit to the amount of back pressure, if there is sufficient initial steam pressure to produce the required power within the limits of practical cylinder bores.

Some plants may be running their boilers at low pressure and using the steam only for heating and processing. These boilers usually will produce steam at a sufficiently high pressure to operate a steam engine at only slightly higher cost since most of the heat generated in the boiler changes water into steam and as the amount of heat necessary to raise the steam pressure is relatively small. It is an advantage to make this steam do double duty and to obtain the resulting low cost by-product power.

Analysis of Costs

Cost of generating this by-product power consists of operating and fixed costs. Operating costs are lubrication cost and about 10 per cent of the steam cost (the other 90 per cent of the steam cost being rightfully charged to heating cost). Fixed costs based on 20 year life are: interest on investment, say 6 per cent; annual depreciation 5 per cent; annual maintenance 2 per cent. As a general rule, no extra operating labor is necessary with the modern steam engine. In spite of numerous items in the cost, the total is so low that steam engines usually pay for themselves in 6 to 12 months time by the saving in power cost.

While it is difficult to prepare by-product power cost charts for the many conditions existing in various plants, it will be well to give a range of expected costs for both large and small engines for one particular set of average conditions. Assume the following: 150 pounds gage steam pressure, no superheat, 5 pounds gage back pressure, 2000 hours operation per year with an average load 50 per cent of full load, all exhaust steam used, and steam costing 50 cents per 1000 pounds. Taking into consideration all operating and fixed costs, the cost of the by-product power would range from 0.75 cent per boiler horsepower per hour (1 cent per kilowatt hour) in a small 12-horsepower engine, to 0.3 cent per boiler horsepower per hour (0.4 cent per kilowatt hour) in a larger 225 horsepower engine, an extremely low power cost. These figures are based on an average load which is 50 per cent of full load. With the higher average load existing in many plants, these figures would be still lower.

An idea of the extremely low cost of modern steam engine by-product power also may be had from a survey made of a large industrial plant where steam is generated primarily for heating and to drive air compressors. The only requirement for the exhaust steam is in the heating system. A 7 x 8 steam engine drives a draft fan and four underfeed stokers, the latter operating the four 400-horsepower boilers.

Excess Steam Used

During the heating season (212 days) the plant heat balance is ideal as the heating load takes all the exhaust steam. In the summer months (153 nonheating days) there is an excess of exhaust steam.

This boiler room operates continuously 24 hours a day, 365 days a year, thereby imposing continuous duty upon the engine. In the 5 years that it has been in continuous service, only one minor replacement (that of the governor gears) was necessary.

The officials of this plant advise that steam engine drive provides simple automatic control of boiler operations and that its smooth automatic regulation over a wide range of speeds results in greater overall boiler efficiency with the consequent saving of fuel. Details for this survey are shown in the accompanying table.

If the cost of 1.23 cents per kilowatt hour as shown is compared with that of operating an electric motor under similar conditions with purchased current available at 2 cents per kilowatt hour including the demand charges, there would be a saving of $2523 per year, 51.7 per cent of the first cost, which would pay for the engine instalaltion in less than 6 months and show an annual return on the investment of 229 per cent.

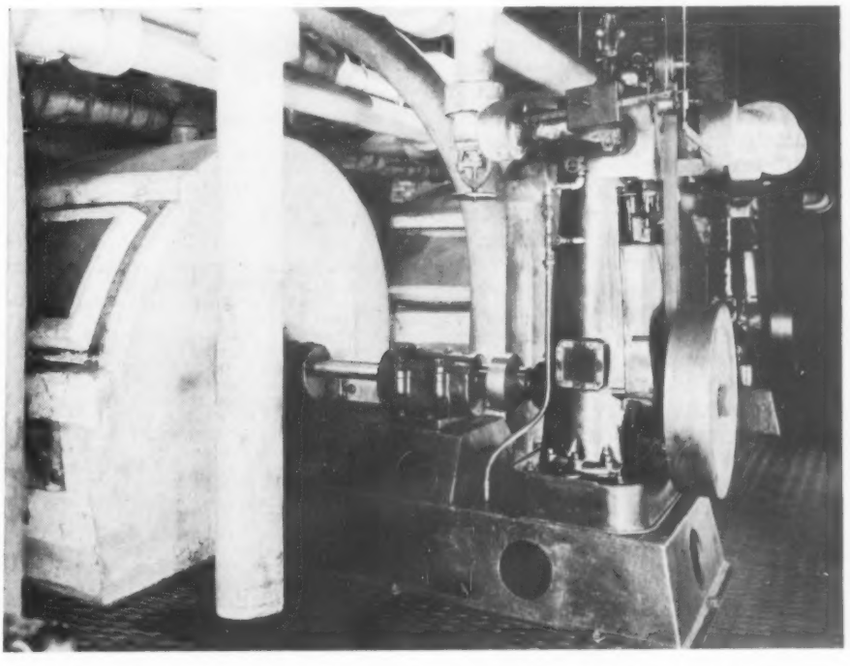
This particular survey is a good example of a plant that has use for exhaust during only a part of the year. If the exhaust is used the entire year as it can be in many plants, the cost is considerably lower.

In addition to the foregoing "thermal" considerations, it is important to know how a modern steam engine should be designed and constructed, and how its characteristics affect the question of "modernization."

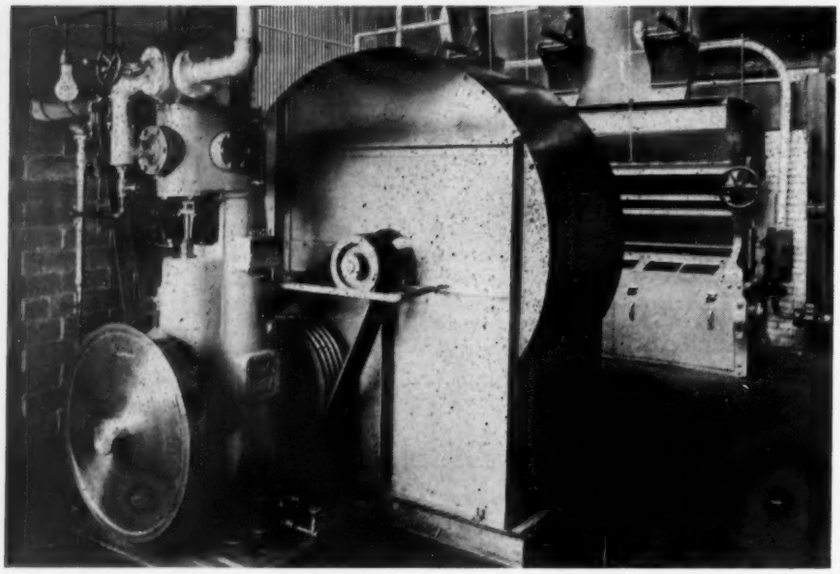
Any prime mover should have accurate control, correct operating characteristics, reliability, and modern design and construction. That the modern steam engine has definite advantages in these respects in steel and metalworking plants is illustrated by the many installations made to drive stokers, forced and induced draft and ventilating fans, pumps, driers, whizzers, blowers, exhausters, mixers, mills, compressors, etc.

Modern Engines Flexible

The modern steam engine has wide, smooth, flexible, easily adjusted speed range with infinitely small steps and is connected easily to and operated by automatic control. Whether the control is manual or automatic, definite speed is



One of the 12 steam engines employed for driving induced draft fans



Engine-driven draft fan installed at a tin plate plant in the Pittsburgh district

maintained for each point of control. In other words, there is good regulation and, of prime importance, no hunting. The steam engine also is started quickly as little warming-up is required. It can be placed in service without delay.

Two Types of Governor

Governors are throttling or automatic type. The throttling type of proper design and materials for the steam conditions, is used in adjustable speed service in three ways: (1) for manual control, (2) as a maximum speed stop in conjunction with automatic control, or (3) with an attachment directly connected to the automatic control, in which case the governor maintains definite engine speed for a particular setting of the control. With throttling governor, the engine is furnished with: (1) a fixed eccentric having a fixed point of cut-off, or (2) with a hand adjustable eccentric by which the cut-off can be varied when the engine is not running, or (3) with a variable eccentric by which the cut-off can be varied while the engine is running by simply turning a hand wheel. The last two devices permit setting the cut-off at the most economical point, thus decreasing the steam consumption approximately 10 per cent below that obtained with fixed eccentric. They also permit reversing the direction of rotation. For wide speed range this type of governor can be furnished with a V-port valve cage which makes the governor stable at low engine speeds or light loads with the governor valve just cracked.

The automatic or flywheel type of governor automatically adjusts the cut-off for best economy but is suitable only for constant speed service, although it also can be used as a maximum speed stop in connection with automatic control in variable speed service. Its regulation is within 2 per cent from no load to full load.

Steam engine speed is conservative and conducive to long life. Fans, pumps, driers, exhausters, mills and compressors may be connected directly. Only a small speed reduction is necessary to drive stokers and slow speed machinery. Higher speed equipment can be driven readily by flat or V-belt, or by chains. Its high starting and running torque and large overload capacity are desirable features for most installations.

As to reliability, the modern heavy duty steam engine is of rugged construction, has been improved continuously and is fully enclosed, self-oiling and oil-tight so it is common to have months of continuous service at full load. An example is a recent record still run made at the Kendall Refining Co. where a modern steam engine drove a side cut pump 24 hours per day for 168 days continuously.

Design Greatly Refined

While no radical changes have been made in the basic design of the steam engine as years of service have proved its soundness, the design has been refined greatly by taking full advantage of high-grade modern materials now available and by careful refinement of each part from the standpoint of actual field requirements.

This refinement has made the modern steam engine simple, foolproof and reliable. It practically has eliminated attention by the op-

(*Please turn to Page* 74)

Field Data for Engine-Driven Stoker and Fans

LOAD DATA

Maximum h.p. required	42
Average h.p.	29.4
Hours operation per year, 24 hr. per da. × 365 da. per yr. =	8760
R.p.m. (normal)	300

STEAM DATA

Pressure range, lbs. ga.	200
Quality	Dry
Superheat	None
Back pressure, lbs. ga.	2.5
Feed water temperature, deg. Fahr.	185
Cost of steam per 1000 lb.	$0.50

FIRST COST

First cost of engine installed	$1100.00

ANNUAL FIXED CHARGES

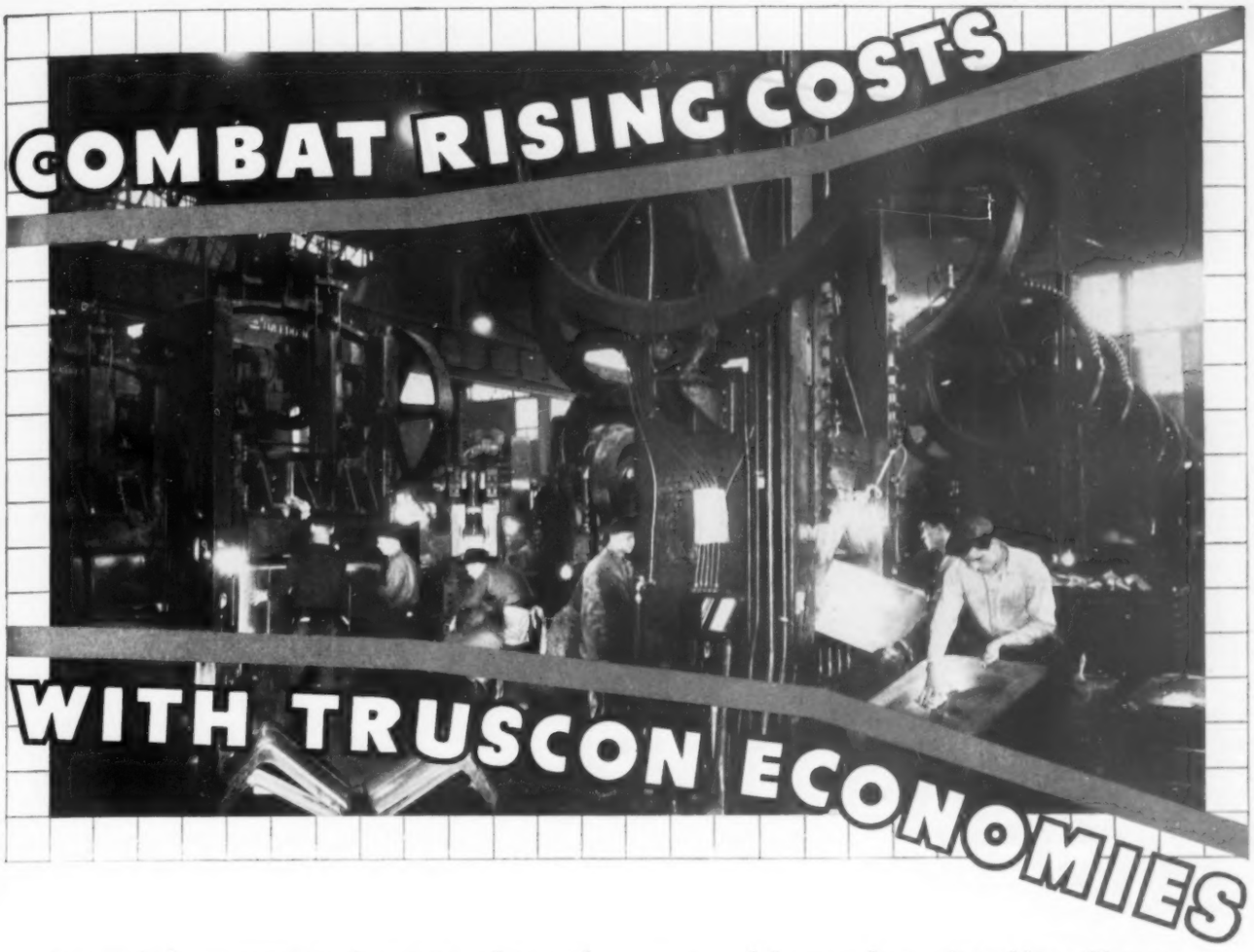
Depreciation—5% of $1100	$ 55.00
Average interest at 6%—$1100 × 0.0315	34.50
Maintenance—2% of $1100	22.00
Total	$ 111.65

ANNUAL OPERATING COST

Determination of useful heat in exhaust:
Engine steam consumption, 1058 lb. per hr.
Heat in live steam, 1199 B.t.u. per lb.
Heat supplied engine, 1058 × 1199 = 1,270,000 B.t.u. per hr.
Radiation loss, 2% of total = 25,400 B.t.u. per hr.
Engine mechanical efficiency, 87.3%
I.h.p., 29.4 ÷ 0.873 = 33.7
Heat equivalent of one, I.h.p. = 2545 B.t.u. per hr.
Heat converted to work, 33.7 × 2545 = 86,000 B.t.u. per hr.
Heat used by engine, radiation loss+work=25,400+86,000=111,400 B.t.u. per hr.
Heat left in exhaust, 1,270,000—111,400=1,158,600 B.t.u. per hr.=1,158,600÷1058=1097 B.t.u. per lb.
Available heat in the live steam, 1199—(185—32)=1046 B.t.u. per lb.
Available heat in the exhaust, 1097—(185—32)=944 B.t.u. per lb.
Per cent useful heat left in exhaust, 944÷1046=90.1%
Steam cost for 212 da. heating season, 1058×24×212×0.099×0.50÷1000=$266
Steam cost for 153 days nonheating season, 1058×24×153×0.50÷1000=$1940
Total steam cost per year, 266+1940=$2206
Lubrication cost per year, $37
Extra operating labor cost per year, none
Total operating cost per year, 2206+37=$2243

TOTAL ANNUAL COST

Total annual cost, fixed cost+operating cost=111.65+2243=$2354.65
This is equivalent to 2354.65÷(29.4×24×365)=$0.00915 per B.h.p. per hr. or = $0.0123 per KW.-hr.



Truscon's huge concentration camp of pressed steel facilities affords you a modern base of operations from which to wage successful war against rising costs. • Strategically located at Cleveland, Ohio, Truscon's 13 acres of plants are staffed and equipped for the exclusive production of pressed steel parts. • Witness this typical example of a manufacturer allied with Truscon in a campaign for lower costs. The field was highly competitive. High quality was essential to protect saleability. Retail prices made profits fractional. The only possible solution was to reduce costs without interfering with quality. • Truscon sales-engineers surveyed the manufacturer's problems. Plans were formulated for Truscon to produce by straight-line, mass-production methods, the entire pressed steel requirements for this manufacturer's products. But speed was essential. • Truscon's complete organization . . . ready and fully equipped to meet the emergency . . . moved into action without delay. Today, the manufacturer is in a stronger competitive position then ever . . . gaining higher profit levels as he advances farther into competitive territory. When YOU are ready for action to improve YOUR profit position, TURN TO TRUSCON. Write for a prospectus of Truscon Pressed Steel Service.

TRUSCON STEEL COMPANY

PRESSED STEEL DIVISION

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IF IT'S MADE OF PRESSED STEEL — TRUSCON CAN MAKE IT!

POWER DRIVES

Efficient Lighting Plus Economies Is Result of Ingenious Light System

IN A PLANT recently visited the lighting was arranged to economize on light without in any way skimping on adequate illumination of working areas. Two common faults of lighting arrangements are that each switch controls too large a section of floor space and to obtain any illumination the whole area must be flooded with light.

In this plant to economize on certain large expensive machines production is arranged so that such equipment operates on two or three shifts, depending on whether the general plant operates a single or double shift. Therefore, the general illumination is arranged by bays, each switch controlling a single bay. Thus, only the necessary large lamps are on.

Supplementary System Used

So that the surrounding sections of the plant are not entirely dark a supplementary lighting system is installed and controlled by several switches, each lighting up only a portion of the floor. The extra-shift operators turn on the large lamps in their bays and the supplementary system around them. Thus if it is necessary for them to leave their machine they can get about without turning on more lights or stumbling. In addition, these supplementary lights are used by the janitors for cleaning up at night.

In still another plant a somewhat similar arrangement of supplementary lights is in effect. In this case the extra lights are for the night watchman and janitors; therefore the entire room is lighted from switches which can be turned on or off at either entrance.

The watchman enters a department, turns on the lights, and turns them off as he leaves the room. Thus he is never in total darkness and does not depend upon a lantern or flashlight as he goes about. These lights are ample for him to see the entire room but are much lower candlepower than would be required for production. The current consumption therefore, is much less than if the main lights were turned on. As the janitors have lights on most of the night in one department or another, the saving is considerable.

• • •

Quality Drives Cheapest

Quality transmission equipment, if abused, may give no better service than lower quality products properly used. This is not an argument for low-quality products but for better use and care of good products. The extra size and care necessary for low-quality products to keep them in proper condition will increase the cost until usually greater than for a corresponding item of better grade.

This assumption is particularly true of belts. An underloaded, properly cared for belt of second-grade quality may give longer life and satisfaction than a first-quality, or even special belt operated under excessive tension and overloaded, conditions which actually subject the belt to abuse.

However, the use of second-quality belting is seldom recommended for severe service. To obtain sufficient belt for such work would require the installation of a belt much larger in size than if a first-grade unit is used. As a result the cost would be practically the same but the amount of extra attention required for this lower grade product would increase this considerably. Industry has many types of light drives where the second-grade belt may be used with an efficient and satisfactory result.

Better grade bearings of ample rating repay the extra cost in less frequent servicing, lubrication and power savings alone in a year or so without taking into account the greater security from interrupted operation.

Shading on quality of product is comparable to shading on the size or rating of any other type of drive unit. Either is an attempt to skimp on first cost. Such attempted economies often turn out unsatisfactorily, especially since an additional expenditure of 10 per cent for higher rating may increase life and satisfaction by 30 to 50 per cent or more. Skimping in price is seldom economical over a period of time.

• • •

Old Motors

Here and there over the country industrial plants are still using old type, big armature electric motors. For most classes of services no fault is found with the operation.

In one case where the equipment was subject to a very considerable slowing down in the cycle of operation the belt was either thrown off frequently or slipped excessively and burned.

An investigation by a representative of the belt manufacturer noticed that the heavy armature provided so much flywheel effect that the motor "plowed" on instead of responding to the overload. The belt, as the flexible connection, suffered in consequence.

When a new motor was installed of a type especially adapted to the slowing down in the cycle no more trouble was experienced. For some classes of work this flywheel effect might be highly desirable but was not satisfactory in this particular case.

• • •

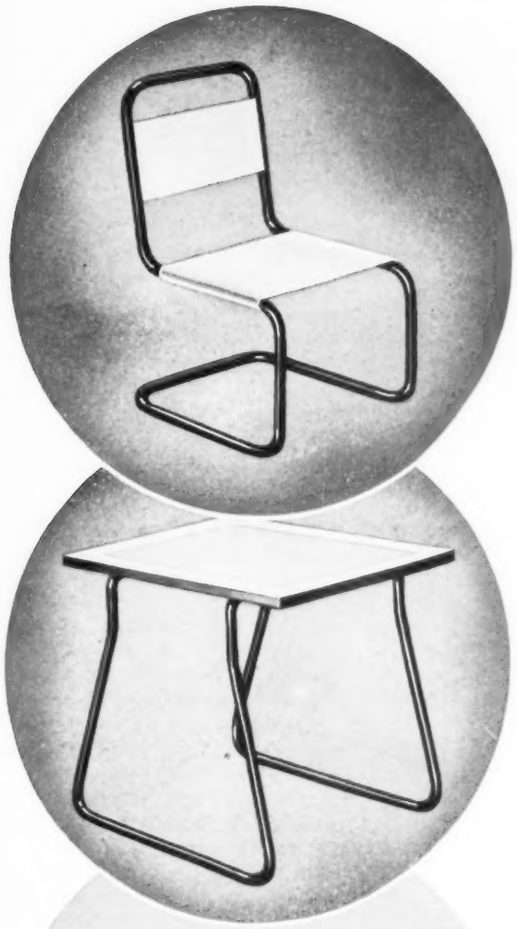
Using a single oil for every purpose is generally a poor economy. Too many different oils may be a step too far in the opposite direction.

FOR LIGHT WEIGHT . . .

. . . STRENGTH

. . . ECONOMY

RAIL CARBON STEEL TUBING



● Tubing presents limitless possibilities to designers of practically every type of product. Consider your products . . . and you'll probably find many applications where this strongest structural shape for the weight involved will improve design and appearance, increase strength, reduce weight or make possible lower costs and greater profits. ● Then consider Rail Carbon Steel Tubing . . . high quality steel, the same analysis as used in railroad rails, electric resistance welded into tubing that is exceptionally strong, tough and rigid . . . and surprisingly low in cost. It is the greatest structural tubing value obtainable today. ● Full information on Rail Carbon Steel, the wide variety of forms and sizes available in electric resistance welded tubing and rolled shapes, and engineering data are contained in the Steel and Tubes Handbook No. 200-RC. A copy will be gladly supplied on request.

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WELDING, etc.

by Robert E. Kinkead

Welding Shop Is Valuable Adjunct to Steel Foundry

During 1934 and 1935 a considerable amount of heat was developed between the advocates of a welded rolled steel construction and the owners of steel foundries. The rising curve of steel foundry production has settled the argument. At the present time, practically all steel foundries have enough production and prices of steel castings are rapidly reaching levels where fair profits may be earned from steel foundry operation. The question is being debated in many quarters: Where do we go from here? Should more steel foundry capacity be built or should the overflow be built in welded steel?

Cost is the determining factor. But cost of welded steel construction is a direct function of the equipment available to build it. An eight hundred dollar arc welder and a dark corner, not otherwise in use, will permit of some welded steel construction at permissible costs—but not very much. Equipment to cut, to form hot or cold, materials handling apparatus, modern welding equipment and ample space are all required to build welded steel construction at lower costs than those at which the steel castings may be produced. The question may well be asked: Would not a fully equipped welding shop cost as much as a steel foundry? In some cases, the welding shop would cost as much or even more than a steel foundry to do the same job. In most cases, the welding shop, properly designed, will cost one-half or one-third as much as a steel foundry, if proper selection of parts to be made in welded steel is made and the tough jobs sent to the foundry. The best answer is usually a compromise.

The argument for operation of a welded steel construction department by steel foundries is sound since it permits diversification and more efficient use of equipment and prevents uneconomical duplication of equipment among manufacturers of a given industrial district. Steel foundrymen will be overlooking a great opportunity for service if they fail to take advantage of the situation at this time.

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

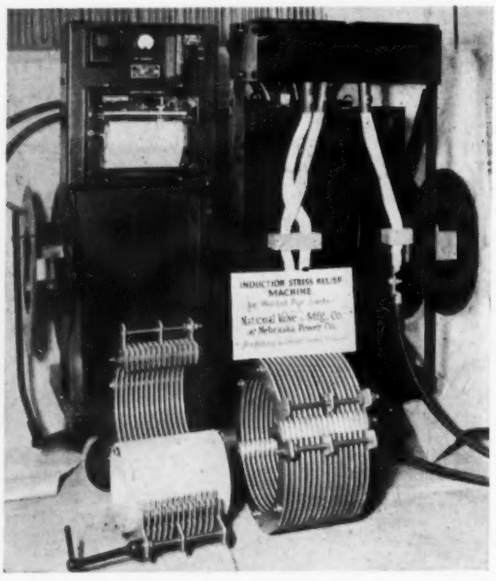
New Steel Needs New Weld

Many of the new steels have a yield point higher in relation to ultimate strength than the low carbon steels heretofore used. The case is well illustrated by the group of new low alloy steels. This reduction in the range of plastic deformation necessitates better welding in the direction of more perfect contours of the welds. A welded assembly of these low alloy rolled steel parts may be equivalent to a steel casting in every other respect, but if the weld contours are improper due to roughness or undercutting, the same length of service life may not be expected of the welded structure.

No small part of the safety and reliability of the low and medium steel structures of the past and present has been due to the wide range of plastic deformation which permitted stretching out of metal where stress concentrations were high. Narrowing this range narrows this factor of safety. The safety of using the low alloys may be just as great as in the use of the low and medium by care in the matter of weld contours.

♦ ♦ ♦

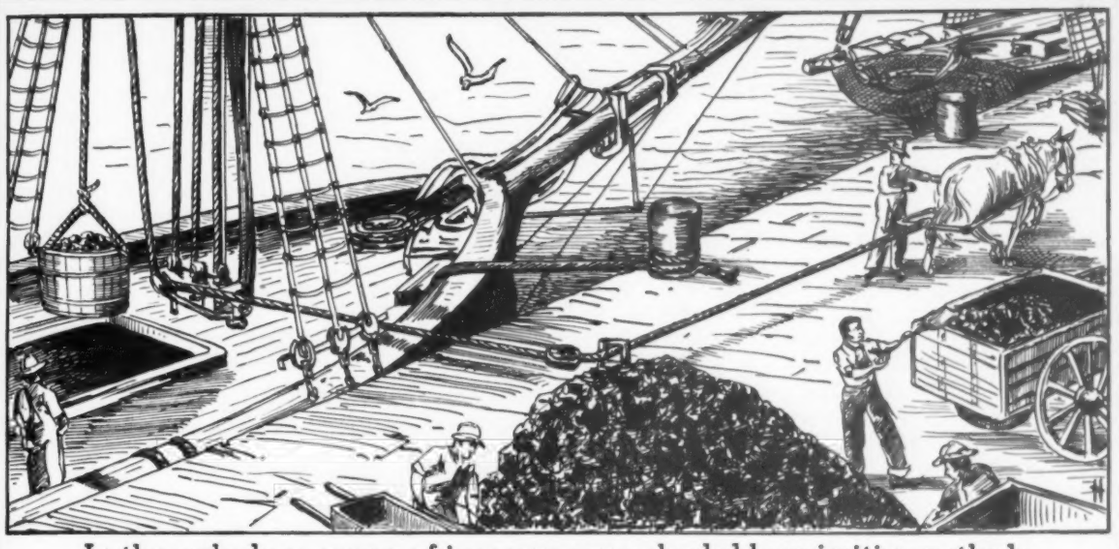
The boiler shop owner who said that his shop was not unheated, just well ventilated, begins to have trouble from cracks in the weld about this season of the year. On plate above ½-inch thick, the trouble usually starts at 20 degrees Fahr. and gets worse as the lower temperatures are reached. But it is a fact that almost any job can be done at winter temperatures if enough salamanders are used to keep the metal itself above 20 degrees Fahr.



Relieves Stress In Welded Pipe

POWER plant construction engineers are now demanding stress relief equipment for welded joints where high pressures and temperatures are used for speed and uniformity of heating. The apparatus shown uses 60-cycle inductive current and is being applied by National Valve Co. at the Steam Electric station, Omaha, Neb.

SINCE 1850



In the early days cargoes of iron ore were unloaded by primitive methods. A horse, block and tackle, and a bucket on a swinging boom made up the full equipment used in unloading iron ore cargoes.

CLIFFS SHAFT LUMP ORE
FOR OPEN HEARTH
FURNACES

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Lake Superior Iron Ores
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COAL—Industrial . . . By Product . . . Domestic

THE CLEVELAND-CLIFFS IRON CO.

UNION TRUST BLDG. CCC CLEVELAND, OHIO

Stainless Steel Trim Is Feature of Newest Lightweight High Speed Trains

FIRST of the 7-car Twin Zephyrs to be operated between Chicago and St. Paul and Minneapolis has been delivered to the Burlington railroad by the Edward G. Budd Mfg. Co., Philadelphia. The train is entirely of 18-8 chromium-nickel stainless steel with joints by the company's shotweld process. Fully articulated, air conditioned and streamlined, the train has capacity for 200 passengers. Together with its twin, it will replace the 3-car Zephyrs, each with capacity for 80 passengers, now engaged in this run; the latter will be placed in other service by the road.

Each of the new trains is powered by two 900-passenger diesel engines housed in the head car. Forward end of the second car carries additional diesel equipment and generators for operating lights, refrigerators, air conditioning units and radio-phonograph equipment. The greater portion of the second car is devoted to a cocktail lounge with a quarter circle bar. This lounge, seating 34 guests, has built-in moon sofas, movable chairs and an annex with four tables seating 16. Venetian blinds, colorful drapes and concealed lighting add to its smartness.

The third and fourth cars are coaches, each seating 60 passengers and provided with complete carpeting, double reclining seats and collapsible center arm rests, modernly appointed wash rooms, luggage compartments, colorful upholstery and drapes and indirect lighting. The fifth car on each of the new Twin Zephyrs is a full length diner with smart harmony between the walls, chairs and carpeting. Radio and phonograph reception are both instantly available. A feature of this car is an air-curtain designed to keep kitchen odors from the rest of the car. The aisle alongside the kitchen is air conditioned so that passengers passing through will at no time be annoyed by heat from the ranges. Telephone service connects the dining car with the cocktail lounge and parlor cars.

Following the diner is a parlor car with 19 rotating reclining parlor car chairs, modern wash rooms and roomy luggage compartments. A drawing room in the car has a private detached dressing room with davenport, washstand and dressing table. The last car is equipped with 24 rotating reclining parlor seats as well as occasional chairs and a card-playing section and tapers off in a typical rounded solarium.

The new Zephyrs are built with the same low center of gravity which marked their predecessors. Heating and cooling facilities of the train are thermostatically controlled, assuring even and comfortable temperatures at all times. The wide windows are of double plate safety glass, hermetically sealed, and the space between each of the double windows is filled with dry nitrogen which prevents frosting of the windows regardless of the outside weather.

Overall length of each of the new trains is 467 feet 4 inches, while each passenger carrying car is 10 feet and ⅛-inch wide or 2½ inches wider than conventional cars and 7½ inches wider than previous Zephyrs. The new trains are completely articulated and run on roller bearings.

ROUNDED solarium type ends are characteristic of these trains. Interior of the solarium is shown at left, while a view of the new dining car is at right. Feature of the dining car is an air curtain in the door to the kitchen, preventing heat and odors from entering the diner

Tools and Dies Packed in Newly Designed Container

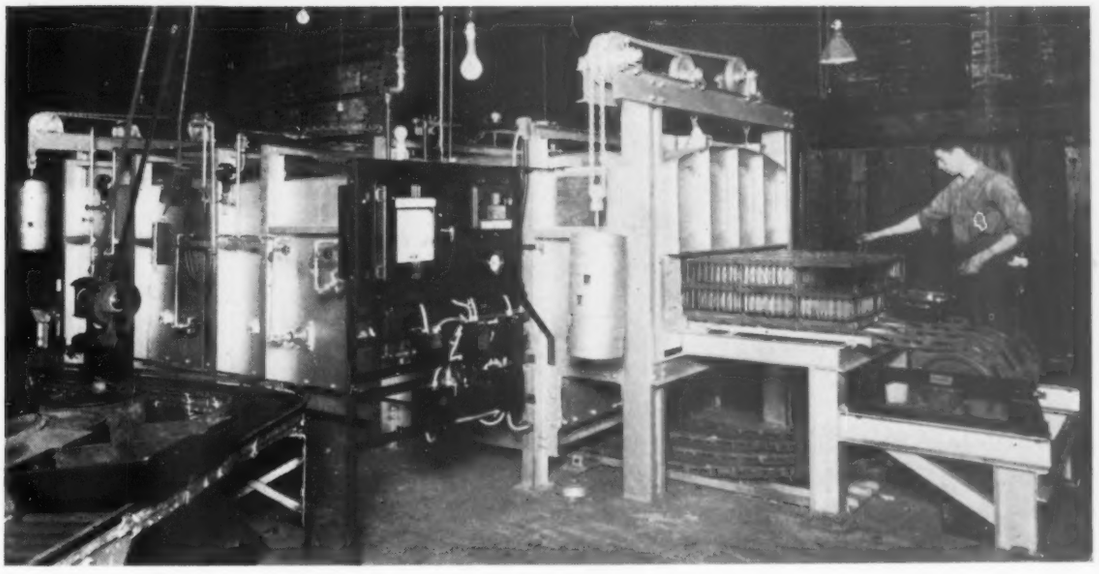
Recently adopted by Carboloy Co. Inc., Detroit, for shipping tools, dies and wheel dressers, a new container will be of interest to executives in the metalworking field, according to the company. Constructed of heavy compressed fiber board and reinforced with metal edges, these boxes will withstand a 200-pound weight and are sufficiently tough to stand up under the wear and tear of toolroom crib handling, it is claimed.

They are also designed to aid tool crib employes in locating desired tools more rapidly. A specially processed coating resists grease and smudge so that the boxes may be identified readily at all times.

Heating Handbook Offered

Oil Heating Handbook, by Hans A. Junitz; fabricoid, 456 pages; published by J. P. Lippincott Co., Philadelphia; supplied by STEEL, Cleveland for $3.50, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This handbook deals mainly with the principles, installation and maintenance of oil burners, particularly with reference to domestic use. The book is divided into four main divisions dealing with fuels and combustion; heating, including operative controls; installation and operation of oil burners; and retail sales. The last part deals with forms, tables and terminology.



VALVES of special stainless steel are heat treated in this continuous furnace

Continuous Furnace Provides Special Heat Treatment for Stainless Steel

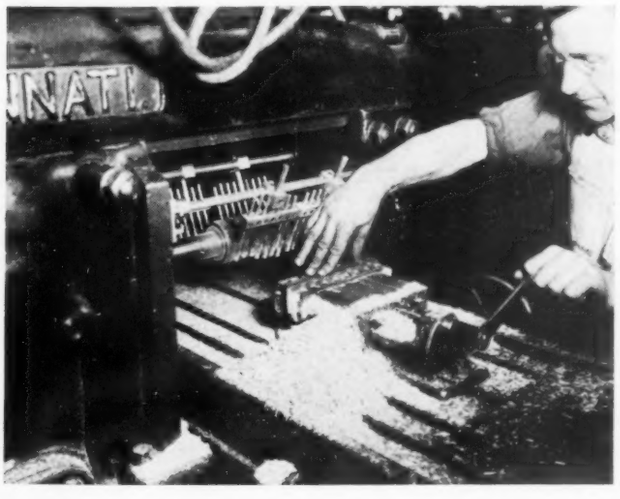
FOR speeding up production and to provide special heat treatment required by Silicrome X type stainless steel automotive valves, Thompson Products Inc., Cleveland, has installed a new 30-foot Surface Combustion Corp. continuous furnace. Valves are placed vertically in special double-deck carriers riding on four heat-resisting alloy chains which are supported on channels on the furnace hearth. Each row of carriers accommodates 572 valves; production is at the rate of 572 valves every half hour, or over 27,000 valves per 24-hour day.

Heating chamber of the furnace is about 18 feet in length and is divided into two zones, a heating zone about 4 feet in length and a soaking zone the balance. Hearth width is about 36 inches.

Burners are of the high-temperature type, firing directly into the heating chamber, both over and under the work. Four on each side are arranged to underfire the work, while at the charging end are two overfiring burners on each side, placed on an angle to provide swirling action in the hot gases or quick heating of the cold steel. These overfiring burners are staggered with respect to the burners which underfire the work at this end of the furnace.

Due to the fact that this special stainless steel requires in its heat treatment a 14-hour soak at 1400 degrees Fahr., the chain drive is necessarily slow. Through a special type of timer operating relays to the conveyor motor, the chain is moved forward intermittently, thus avoiding a constant tension on the chain which might result in distortion of the chain because of creep.

Temperature control is provided to maintain constant heat, within plus or minus 10 degrees. As the valves emerge from the furnace the carriers are lifted off the conveyor chain, placed on a nearby roller conveyor and allowed to cool in air.



MILLING machine hazards are eliminated by this simple guard of adjustable steel pins which protects operator's fingers

Protects Hands on Milling Machines

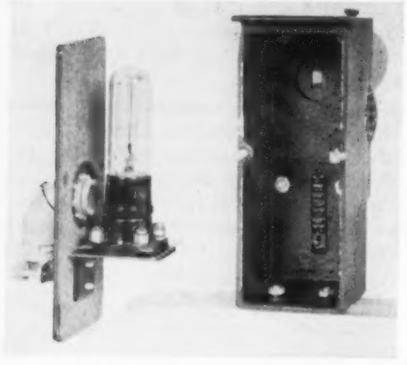
AS A GESTURE of goodwill to American industry, International Business Machines Corp., 270 Broadway, New York, is offering gratis to industry drawings and specifications of a practical safety guard for milling machines. The device was designed by R. E. Frederick, that company, and was demonstrated at the recent meeting of the National Safety congress in Atlantic City.

The guard consists of ¼-inch steel pins of varying lengths held by screws in a T-slot plate fastened on the column between the arbor support arm and the spindle. Case hardened, the pins are held rigidly in place. The entire guard may be moved horizontally to cover the cutters at any position on the machine, and two or three guards may be mounted side by side to give complete coverage on wide milling operations.

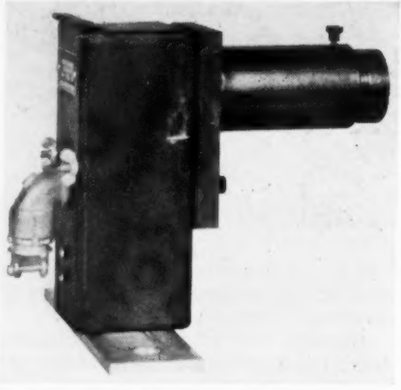
PROGRESS IN STEELMAKING

Yield of 48-Inch Structural Mill Is Improved by Phototube Pyrometer

A PHOTOELECTRIC pyrometer, applied to a 48-inch shape mill in the Saucon plant of Bethlehem Steel Co., Bethlehem, Pa., is making it easier for the operators to obtain more nearly perfect duplication of sections, by providing them with constant, accurate indication of the temperature of the bar being rolled, and thus is contributing to improved mill yield, according to A. J. Standing, superintendent of the company's Saucon electrical department.



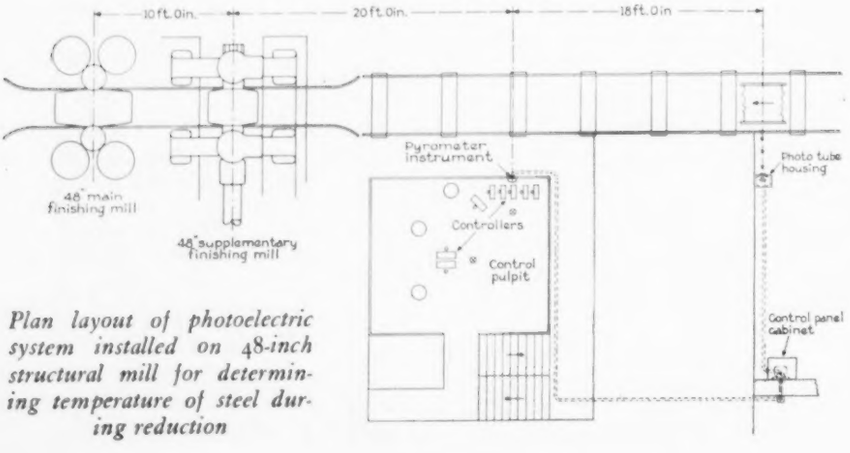
Phototube holder dissembled to disclose construction



Phototube holder assembly for focusing on hot steel

In making the application, particular attention was paid to the problem of obviating the interference caused by scale on the bars and by steam or water vapor surrounding the bars. These objectionable factors were eliminated by mounting the phototube sufficiently remote from the mill to avoid the steam disturbance and by focusing the tube on the center of the flange of the bar which, being in a vertical plane approaching the mill, is generally free from scale and water.

The installation consists of a General Electric phototube in a dust-tight cast-iron holder with a light tunnel and adjustable aperture, and a Pliotron amplifier used for boosting the output of the phototube sufficiently so that it will actuate an indicating ammeter that is calibrated in degrees Fahr. of the heated body. The calibration is made by checking against an optical pyrometer at given points on the scale. The amplifier panel is mounted on the building wall in order to protect it from undue heat and vibration. The indicating instrument, however, is mounted in the roller's pulpit in full view of the operators so that they may be guided by its indication of the temperature of the bar entering the mill in adjusting the screwdown controls.



Plan layout of photoelectric system installed on 48-inch structural mill for determining temperature of steel during reduction

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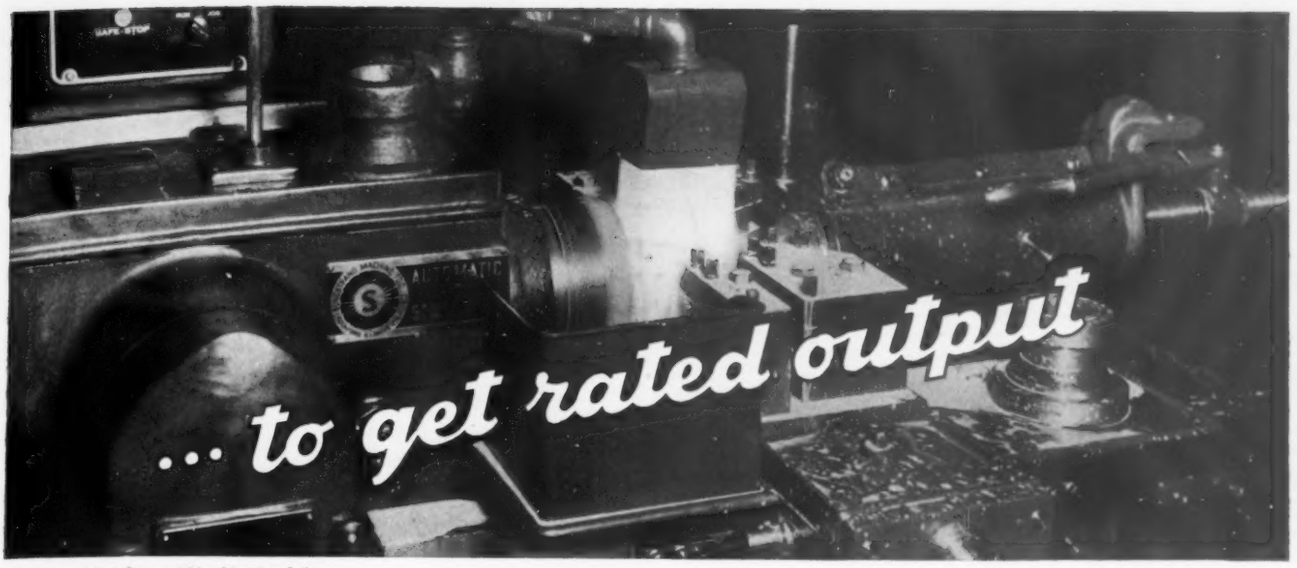
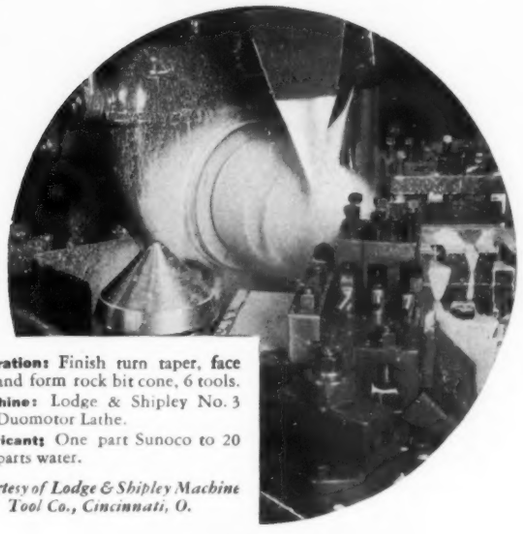
Protects Metal in Transit

Rusting that occurs on the surface of structural steel between fabrication and painting is rendered harmless by the application of a colorless liquid which destroys the existing oxidation and prevents further deterioration. Metal coated with this liquid at the point of fabrication arrives on the job protected from corrosion and in condition for the finish coat of protective paint if one is to be applied. The rust preventative is a clear, odorless, colorless liquid that may be brushed, dipped or sprayed at any temperature above 35 degrees Fahr. Any rust that may be on the surface of the metal is sealed and rendered chemically inert because of the penetrating quality of the coating. The material remains permanently flexible. Old steel does not have to be cleaned before refinishing when the liquid is applied as the priming coat inasmuch as it seals the scale into a tough bond and neutralizes the progressive corrosion that normally would continue. The liquid has a covering capacity of 1500 square feet per gallon on a new steel surface, sets in 24 to 36 hours, withstands heat up to 550 degrees Fahr. and resists salt air and acid and alkali fumes to a marked degree.



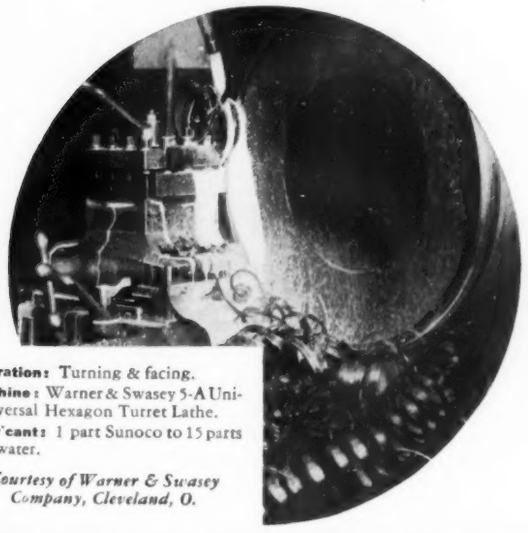
Courtesy of Sundstrand Machine Tool Co.

FLOOD TOOLS AND WORK *with* SUNOCO



Operation: Finish turn taper, face and form rock bit cone, 6 tools.
Machine: Lodge & Shipley No. 3 Duomotor Lathe.
Lubricant: One part Sunoco to 20 parts water.

Courtesy of Lodge & Shipley Machine Tool Co., Cincinnati, O.



Operation: Turning & facing.
Machine: Warner & Swasey 5-A Universal Hexagon Turret Lathe.
Lubricant: 1 part Sunoco to 15 parts water.

Courtesy of Warner & Swasey Company, Cleveland, O.

Although the modern lathe meets all the requirements for high-speed turning, the production of quality work at rated output depends on the performance of turning tools. They must take heavy, clean cuts at high surface speeds with long runs between tool resharpenings,—and that calls for an efficient cutting lubricant.

With Sunoco, turning tools retain their cutting edges, chips will not seize, cuts are clean and accurate. To prolong tool life, increase machine hours and get rated output, *flood the tools and work with Sunoco.*

FREE—A Handbook of Modern Machine Tool Practices

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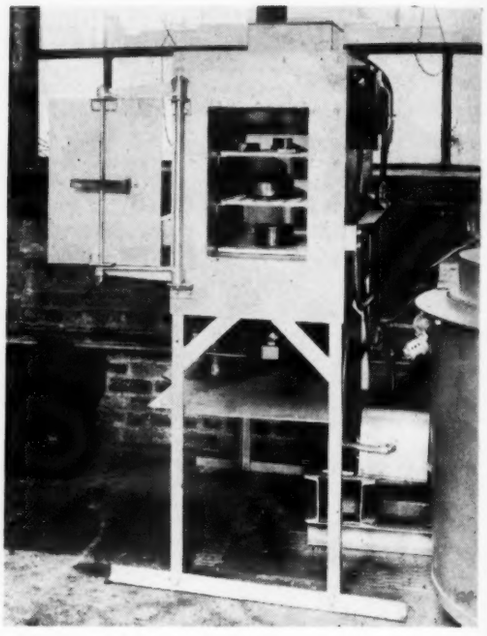
NEW EQUIPMENT

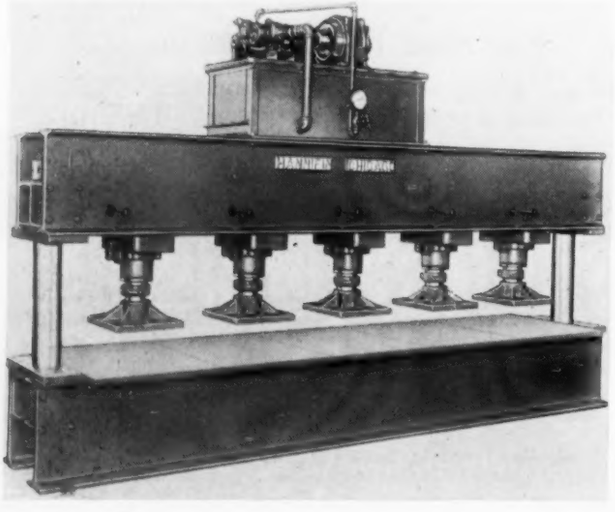
Hydraulic Press—

Hannifin Mfg. Co., 621 South Kolmar avenue, Chicago, has completed a multiple platen hydraulic press designed to simplify production testing of welded refrigerator body tanks under gas pressure. The tanks being tested vary in size and thickness and must be protected against deformation of top and bottom by the interior pressures applied for testing. Tanks are placed on the bed of the press and as many platens as required are moved down into contact with the tank top. Platens in use are automatically held in position at a predetermined pressure regardless of the interior testing pressure applied.

Each platen is individually controlled by a single control lever, and automatically held in position in contact with the tank top. The cycle of operation is automatically provided by a two-pump hydraulic power unit driven by a 3 horsepower motor and incorporating an especially designed valve unit. A rapid advance stroke is provided until the platen touches the tank, when the large volume pump is bypassed and idles at no load. The high pressure pump provides a predetermined holding pressure and automatically maintains the platen in contact with the tank top regardless of the testing pressure applied to the tank. This operation is automatically adjusted for varying tank thickness. Platens are raised by releasing the control lever. Platens are individually controlled and any or all of the platens may be used for individual testing of small tanks, or any number together for handling large tanks. The holding pressure may be adjusted to meet the requirements of various testing pressures.



Lindberg Cyclone tempering furnace for toolroom service, involving the box principal for piecework rather than production service



Hannifin 80-ton multiple platen hydraulic press

• • •

Tempering Furnace—

Lindberg Engineering Co., Chicago, announces a new addition to the line of Cyclone tempering furnaces for toolroom service. Although it has the same operating principle as the standard Cyclone, it is not a production furnace, but a box type unit recommended for use where the work is charged and removed, piece by piece. The method of construction is similar to that of the production Cyclones. The air is driven by a powerful blower fan through the electric heating elements, and into the top of the work chamber, where it passes down

Our Representatives and we, take this opportunity to thank you for your valued patronage in 1936, —and to wish you a Happy and Prosperous 1937

WORTH

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SHEARED STEEL PLATE
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In Large Diameters and Heavy Gauges
BLUE ANNEALED SHEETS
in all gauges down to No. 16 and widths up to 60".

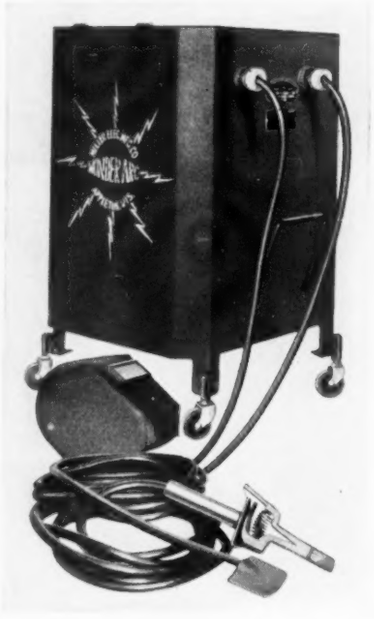
WORTH STEEL COMPANY · CLAYMONT · DEL.

through the charge and returns to the fan through a perforated metal bottom plate. Several shelves are provided in the work chamber to hold small parts when tempering. These shelves can be removed when large parts are to be treated. The furnace door is of the plug type, and is specially hinged so that it can be readily withdrawn and swung away from the opening, the hot face of the door being always away from the operator. These box type Cyclone furnaces are made in several sizes for applications in tempering either to 800 degrees Fahr. or to 1200 degrees Fahr., according to the type of work to be done.

• • •

Arc Welder—

Miller Electric Mfg. Co., Appleton, Wis., has recently designed a new alternating current portable welder under the trade name Wonder Arc. It is a special transformer type with a high power factor, having reactance control, static high frequency arc and sheet metal attachment that makes possible welding of lightweight metals. In capacity, the new welders range from 125 to 600 amperes, standard voltage 220, 60 cycles, single phase. Manufacturer announces that they are safe to operate, as there are no electrical connections between the power input and the welding leads. As they are not autotransformer type, they can be used to weld on grounded systems, such as for thawing frozen water pipes. The



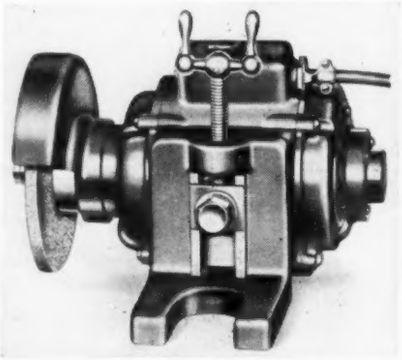
Miller portable alternating current arc welder, special transformer type

exact amperage is supplied by a rotating knife switch control with amperage distinctly marked indicating each welding step.

• • •

Grinder—

Hisey-Wolf Machine Co., Cincinnati, announces a new motor driven angle plate grinder. Machines feature precision ball bearings throughout, mounted in accurately ground housings. Motors are of the com-



Hisey-Wolf motor driven angle plate grinder

Service!

1906 30 years 1936

QUALITY · DEPENDABILITY

DAMASCUS MANGANESE CASTINGS

Manganese and Alloy Steel Castings One Half to One Thousand Pounds Produced in our modernly equipped foundry from electric furnace steel and heat-treated in automatically controlled gas-fired furnaces.

The DAMASCUS STEEL CASTING CO.
New Brighton, Pa.
(*Pittsburgh District*)

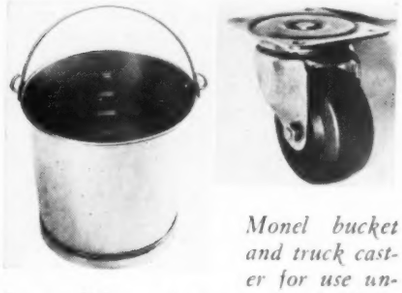
DAMASCUS STEEL CASTINGS
(*Manganese and Alloy*)

mutating repulsion induction type for single phase service. Double lock nuts are provided in order to safeguard the machine for operation in either direction. Heavier spindles, large wheel arbors, square thread feed screw and external cable connector are featured. Grinders are designed to be attached to the tool post of a lathe, the vise of a milling machine or the heads of planers, shapers or boring machines. They are made in six sizes ranging from ¼ to 5 horsepower in capacity.

♦ ♦ ♦

Corrosion Resistant Specialties—

International Nickel Co., 67 Wall street, New York, announces two new corrosion resistant products designed to meet problems in a variety of plants where acid, alkali and other corrosive agents are used. One of these is a Monel caster for trucks, wheeled hampers, and conveyors of all kinds. Available in both the stationary and swivel type, it is adapted for use in laundries, chemical processing plants, dry cleaners and other establishments where corrosive materials are liable to spill on the floor. Metal parts of the



Monel bucket and truck caster for use under conditions where corrosion is likely to occur

caster are entirely of Monel, including bearings, shaft and spacers. Wheels are of a special rubber composition. The casters are manufactured by the Bassick Co., Bridgeport, Conn. The second piece of equipment is designed for use in similar plants and is a special adaptation of an earlier piece of equipment. This is the Whitehead graduated type Monel pail, now available in standard sizes of 12, 14, and 16 quarts.

♦ ♦ ♦

Ball Bearing—

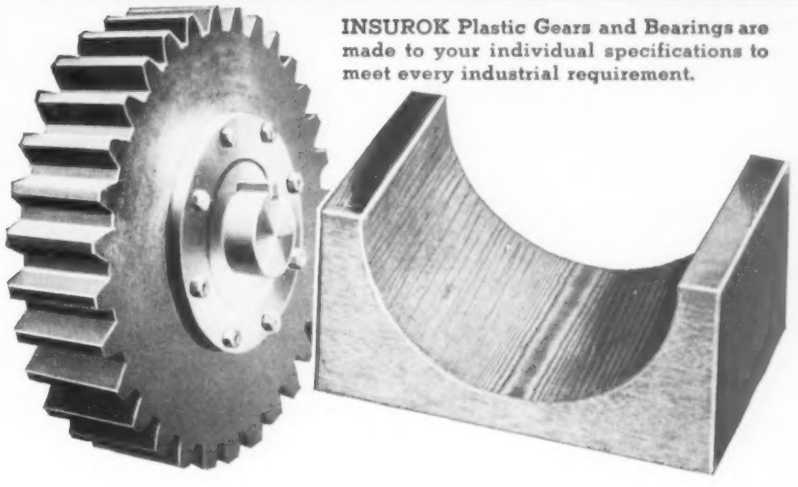
Norma-Hoffmann Bearings Corp., Stamford, Conn., announces its new 9000 series of self-sealed precision ball bearings, offered in two types—the "9000-D" Series, with single side shield, and the "9000-DD" Series, with two side shields. These bearings employ inwardly extending, closely-fitted flanged shields of advanced type, which do not rotate or contact with rotating seal parts, are equally effective in retaining grease in a horizontal or vertical position and, not being subject to excessive wear, permanently maintain their efficiency. The metal seals clear the recess on the inner ring, obviating the possibility of drag or frictional resistance. Consequently, there is little power loss. The shields occupy less space within the bearing than the standard felt seal, and the "9000" Series has greater grease capacity and a more lasting lubricant suply for long continuous service. In the "9000-DD" type, the bearings are totally sealed against the entrance of dirt or foreign matter during assembly, operation or disassembly, providing absolute cleanliness at all times. The series is available in a full range of sizes and interchangeable with single felt seal bearings of the wide outer ring type from 6 to 26 millimeters in bore.

♦ ♦ ♦

Flexible Coupling—

Lovejoy Tool Works, 4973 West Lake Street, Chicago, announces an

You Save 4 Ways with INSUROK GEARS and BEARINGS



INSUROK Plastic Gears and Bearings are made to your individual specifications to meet every industrial requirement.

FOUR distinct savings are effected through the use of INSUROK Gears and Bearings in all production equipment. 1. Saving in cost of installation. 2. Saving in replacements, because INSUROK outwears metal many times over. 3. Saving in power consumption. 4. Lower per unit production costs. To these may be added improved working conditions, freedom from noise and howl.

Richardson engineers will be glad to give you complete data on INSUROK Gears and Graphite-impregnated Bearings, and how you may enjoy these four economies in your own plant. Of course, no obligation involved.

The RICHARDSON COMPANY

Melrose Park, (Chicago) Ill. Founded 1858 Lockland, (Cincinnati) Ohio.
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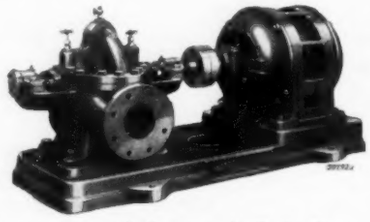
L-R coupling of new design, the type WF, which is made with one of the bodies in the form of a flange which bolts onto the flywheel or a clutch or brake drum of a Diesel, gas or steam engine. The flange-body design reduces the overall length of this coupling by one-third. A recently installed WFR-800 coupling, capable of carrying a load of 324,000 inch pounds, extends less than 6 inches beyond the rim of the flywheel. The L-R Type WF Flexible Coupling will be made in sizes from 3 inch to 14 inch bores suitable for 2500 horsepower at 100 revolutions per minute. Free floating load cushions are held in place by a quickly removable outside retaining spring. This permits larger hubs and greater load carrying surfaces with consequently increased carrying capacity. The load cushions are always in plain sight and can be removed and replaced in a few minutes without tearing down the coupling. This principle has been thoroughly tested in seven years of service. Three types of resilient cushioning material are available for each of these couplings: Metalflex, leather or Multiflex, a rubber fabric.

♦ ♦ ♦

Pump—

Ingersoll-Rand Co., 11 Broadway, New York, is the builder of the Cameron coupled-pump available in sizes from 150 to 5000 gallons per minute. The units are suitable for electric motor, engine, steam turbine or belt drive. Models are available for use with all types of liquids. Heavy duty antifriction ball bearings are used throughout, requiring no adjustment. Wearing rings provide for restoring initial clearance at small cost in short time. Deep water-sealed stuffing boxes are easily adjusted, and the split interlocking gland facilitates repacking. Pump rotor may be removed when inspecting or cleaning the interior of the pump without disturbing bearing adjustment or exposing bearing parts to dirt or moisture. For normal hot and cold water service, the casing is made from close grained cast iron with bronze impeller rings, iron casing rings and bronze shaft sleeves. If the pump is to handle corrosive or erosive liquids, special alloy materials can be furnished.

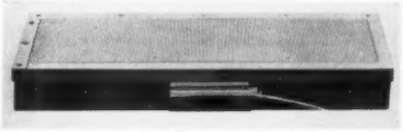


Cameron coupled-pump built by Ingersoll-Rand for capacities of 150 to 5000 gallons per minute

♦ ♦ ♦

Magnetic Chuck—

Taft-Peirce Mfg. Co., Woonsocket, R. I., announces a new fine mesh face plate magnetic chuck designed to cope with the problem of magnetically holding work of extremely small or thin section, due to the limited amount of magnetism which such work will absorb. Fine mesh chucks of this type can be furnished in any size to order and will handle any work ⅛-inch in diameter or larger which is practicable for magnetic holding. Added strength of this type chuck makes practicable holding of many materials which were not successfully held on earlier types, it is claimed.



Taft-Peirce fine mesh face plate magnetic chuck for holding work of thin section

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800 OUTSIDE ROOMS with BATH

$2.50 single $3.50 double

Famous for Fine Foods

Club Breakfasts—
30c . . . 50c . . . 75c

Lunches—
40c . . . 50c . . . 75c

Dinners—
75c . . . $1 . . . $1.25

From the moment you enter our doors you will know that here you are indeed a *guest*. You will appreciate the courteous, cheerful, but *unobtrusive* service for which the Leland is noted. You will revel in the luxury you have a right to expect in a hotel that's as modern as tomorrow's motor car. You will like the superbly convenient downtown location. We hope you will accept our invitation to make the Leland your home in Detroit.

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(AT CASS AND BAGLEY AVENUES)

DETROIT

Recent Publications of Manufacturers

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing STEEL, in care of Readers' Service Department, 1213 West Third Street, Cleveland.

Portable Welder—Lincoln Electric Co., Cleveland. Bulletin No. 314, describing the company's SA150 welder, a portable unit with class B insulation.

Direct-Firing System—Babcock & Wilcox Co., 85 Liberty street, New York. Bulletin No. G-18, illustrating and describing advantages of direct firing coal in the pulverized form.

Power Control—Leeds & Northrup Co., 4908 Stenton avenue, Philadelphia. Leaflet illustrating worthwhile power plant economies effected through modern, null-balance instruments and controls.

Trailer Bodies—Edward G. Budd Mfg. Co., Philadelphia. Folder describing lightweight integral frame bodies having a higher strength-to-weight ratio because the "Shotweld" system permits the use of new engineering principles.

Drop Forging — Chambersburg Engineering Co., Chambersburg, Pa. Pamphlet containing paper on "Developments in Modern Drop Forging," read by R. E. W. Harrison, its vice president, before the American Society of Tool Engineers.

Workshop Precision Lathe—South Bend Lathe Works, South Bend, Ind. Catalog announcing the company's new workshop precision lathe. Over 150 illustrations show the many new styles, features and applications of the new back-geared, screw cutting lathe.

Steam Turbine Units—Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin No. 1181, covering high pressure, non-condensing steam turbine units of three valve reaction type suitable for top turbine service, or furnishing steam for high pressure process work.

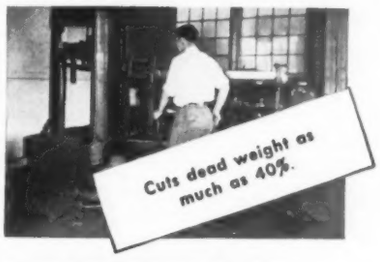
Metal Working Products—E. F. Houghton & Co., 240 West Somerset street, Philadelphia. Booklet giving the points of merit and recommended uses for rust preventives, cutting oils, metal cleaners, liquid baths, quenching oils, carburizers, pickling inhibitors, and steel drawing compounds.

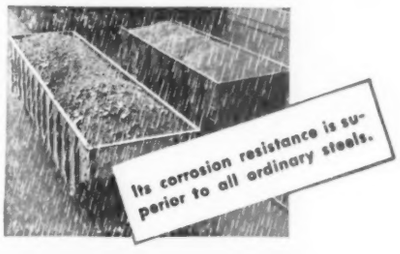
Aluminum Paint—Aluminum Industries Inc., Cincinnati. Booklet showing how the advantages of aluminum paint have been extended to the specialized requirements of all types of maintenance and general product painting and the fact that it is supplied in convenient, completely ready-mixed form.

New Industrial Tools—Bonney Forge & Tool Works, Allentown, Pa. Catalog No. 37M, illustrating and describing a complete new line of tools for industrial purposes; a wide assortment of sets of wrenches, sockets, attachments and other tools are also shown.

"A.W."-70-90 SUPER STRENGTH STEEL

Reduces Weight With No Loss Of Strength





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Philadelphia, New York, Boston, Detroit, Los Angeles, San Francisco, Seattle, Houston

110 YEARS' IRON- AND STEEL-MAKING EXPERIENCE

Advantages of Modern Steam Engines in Industry

(*Concluded from Page* 58)

erator and when attention is required, it has given him every convenience so that adjustments and operations can be carried out quickly and efficiently. It has reduced substantially steam and oil costs. It has placed the "modern" steam engine above the older designs and has given to industry an unusually effective, low cost, proven drive for many types of equipment.

In modern steam engines, all parts of the cyinder, steam chest, piston, and valve in contact with the steam are alloy iron. The cylinders are detachable from the engine frames and fitted with American standard flanged pipe connection. Recent cylinder and valve redesign has improved greatly the previously good economy.

The piston type of valve is balanced perfectly as it is entirely surrounded by the steam and generally is used for fairly dry, superheated, or high-pressure steam. It should operate in a replaceable, ground valve chamber bushing with accurately milled ports. This makes it unnecessary to rebore the valve chamber as a new bushing can be installed readily. This feature also maintains the original water rate. When furnished with rings, the valve should have two narrow rings at each end to eliminate difficulty with wear of ring grooves.

Flat Valve Used for Wet Steam

The flat type of valve is suitable for wet steam as it automatically lifts off its seat to relieve the cylinder of excess condensation without disturbing valve stem alignment. It practically is balanced, should have accurately machined port edges, should be light weight to reduce friction and wear, and be ground to its seat under pressure. A balancing ring held against the steam chest cover by a flat spring will climinate steam pressure from a portion of the back of the valve. The live steam pressure against the remainder of the back of the valve will keep the valve stem tight and automatically adjust for wear.

The engine crosshead should be fitted with adjustable bronze shoes grooved for proper oil distribution. The connecting rod should have a wide bearing at the lower end fitted with a removable babbitt bushing with laminated shim adjustment while the upper end should be fitted with a bronze box with wedge adjustment.

The frame should be fitted through machined surfaces with large panels or doors and hand hole plates, so these can be removed easily and quickly for inspection purposes. These surfaces should be grooved to prevent creepage of oil by surface tension or provided with gaskets. Aluminum panels in the larger engines facilitate handling. Oil arrows, which overlap gutters on the panels, will eliminate oil-leakage along the crankshaft thus removing a serious difficulty experienced with older designs.

Bearings should be babbitt or high-grade bronze, all easily adjusted by laminated shims or other simple adjustment. They should have generous adjustment range to permit years of service without replacement. Main bearings should be removable without removing the shaft and all others have renewable bushings easily replaced if necessary by interchangeable spares.

The lubricating system should be designed from the standpoint of convenience, reliability of operation and low oil consumption. The engine base should contain an oil reservoir, separator and automatic water drain and slope toward a large drain plug, so that it easily can be flushed out and cleaned. The separator and water drain will automatically and continually separate and discharge from the base into an outside drain any condensate that may accumulate.

New Partition Is Improvement

The oil pump, located in the oil reservoir, should have a straight plunger driven from the crosshead, and ball check valves, and should deliver oil into a distributing oil box on the side of the engine frame. The distributing box should be provided with adjustable sight feeds for all bearings, and made of aluminum to give a permanent light-colored background against which the oil feeds are readily visible.

A new type of watershed partition between the cylinder and crank case, is one of the most important recent improvements made in vertical engines. There is sufficient space between the watershed and cylinder so no part of the piston rod, which runs below the watershed, enters the piston rod stuffing box. This prevents bearing lubricating oil from entering the cylinder, a requirement of vital importance for operation without cylinder lubrication and of value in preventing loss of oil. The watershed partition is so trapped and drained that no bearing lubricating oil finds its way to the top of the watershed, eliminating another frequent source of oil loss.

Piston rod and valve stem stuffing boxes are trapped to drain condensate and cylinder oil to the top of the watershed. The watershed is in turn trapped to collect condensate and cylinder oil from the piston rod. A drain on the side of the engine frame removes this condensate and cylinder oil. An excellent feature of this new watershed design is that no part of the piston rod comes in contact with the watershed thereby eliminating wear and the action of wear on the proper functioning of the equipment.

Engines built to these specifications will be modern in every respect.

Methods of Handling Steel Furniture Efficiently

(*Concluded from Page* 46)

caused by shearing, punching, notching, riveting and welding are ground off by ordinary emery wheels, or moving emery belts from 6 to 8 feet long, which pass over the surfaces to be ground. Any spots that require additional attention to insure a smooth, finished appearance are filed by hand. The completed product is then ready for inspection, which includes testing for dents, protrusions, smoothness of edges, rigidity and accuracy of assembly before it is sent to the enameling and finishing department. The finish of steel office furniture must last as long as the equipment if the latter is to have enduring appeal. It is essential, therefore, that quality materials and careful workmanship be used, another reason why it is equally essential to reduce any costs that add to price but not to quality, which explains why materials handling equipment plays such a part in our plant.

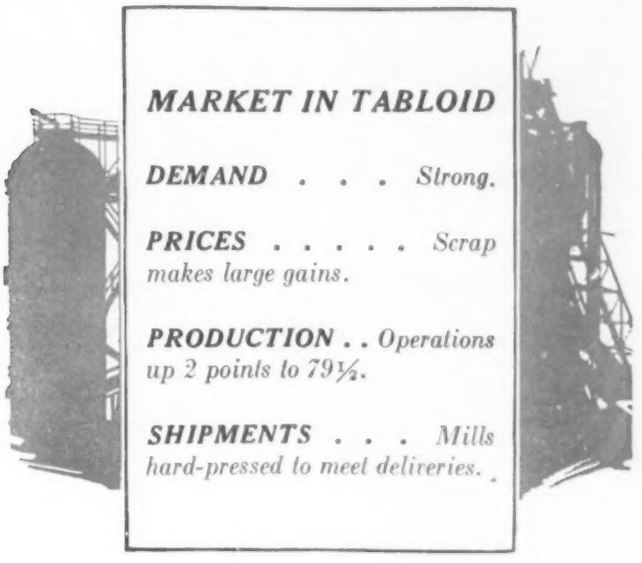
The steel must be thoroughly cleansed of grease, dirt, oil, finger and other marks before applying a prime coat of high grade enamel that will adhere positively to the surface. After baking, a plastic oil base filler is used to take care of spot weld marks, scratches, or slight surface irregularities caused by handling in manufacture. This filler also is baked, and then the entire cabinet is sanded for the finishing coats.

Wherever it is practical, prime coats are dipped. The equipment is usually of the automatic type, where conveyors carry materials through the enamel, then over a space for dripping, and into the ovens. After cooling, material is removed from the conveyors and intermediate and finishing coats applied by spraying and baking.

The next step is the final assembly of the various parts used in making the different items of steel office equipment. Conveyors bring the material to the workmen and the path from then on is as shown in the accompanying illustrations.

Operations at 79½; Scrap Prices Up Sharply

Producers Under Heavy Pressure to Meet Deliveries



MARKET IN TABLOID

DEMAND . . . *Strong.*

PRICES . . . . . *Scrap makes large gains.*

PRODUCTION . . *Operations up 2 points to 79½.*

SHIPMENTS . . . *Mills hard-pressed to meet deliveries.*

STEELWORKS operations increased 2 points to 79½ per cent last week, with producers under pressure to meet required deliveries and with only a month and a half remaining in which to turn out the vast tonnage booked at fourth-quarter prices before the Feb. 1 deadline.

Operations in the Pittsburgh district made a sharp advance of 5 points to 80 per cent; eastern Pennsylvania was up 1 point to 50½; Cleveland 2½ to 78; Birmingham 2 to 76; Cincinnati 4 to 96 and St. Louis 12 to 80. New England was down 14 to 77. Other districts were unchanged. The rate this week will drop because of the Christmas holiday.

Some mills are unable to accept additional business for delivery before Feb. 1, and on new orders the higher prices scheduled for first quarter are being named. Withdrawal of several integrated producers of semifinished steel from the open market has left some nonintegrated mills facing difficulties in arranging for their supplies and shipments.

Probably the most spectacular flair in the markets has been provided by the great demand for scrap and the swiftly advancing prices. STEEL'S scrap composite is at $17.21, highest level in years, the result of a 58-cent rise last week.

Raised $2 in Two Weeks

IN THE Pittsburgh district scrap quotations have risen $2 in a little more than two weeks. No. 1 steel is now quoted at $18.75-$19.25. In the Chicago area most quotations are now at the highest levels in more than 11 years.

The scrap situation has strengthened the position of pig iron. December is expected to set a new peak for the year in deliveries.

Demand for coke is still heavy and prices have increased. By the middle of next month it is expected that 3500 beehive ovens in the western Pennsylvania district will be operating, compared to 3040 at present and only 410 a year ago.

Automobile production increased by 2400 units to 121,038. With labor unions striking at vulnerable spots in the ranks of some suppliers of automotive materials, the assembly rate may not be able to maintain as steady a pace as had been hoped for. Heavy commitments have been made by the automobile industry for steel for the early months of 1937.

The railroad equipment markets experienced a comparatively quiet week after the heavy buying which featured late November and the early part of this month, but large purchases of freight cars are expected in the near future. Inquiries for about 15,000 freight cars were issued last week, bringing the total pending to between 18,000 and 20,000 cars.

Shape awards for the week were down about 13,000 tons to 13,667. Inquiries have been coming out more rapidly as a result of the approaching expiration of the price protection period. Among the pending business is 25,000 tons which will be required by the Pennsylvania railroad for electrification of its main line west to Harrisburg, Pa. Reinforcing steel bar awards last week were up to 2810 tons, compared to 2495 in the previous week. Among the plate awards was 2500 tons for 12 sand and gravel barges.

Because of the advance in the scrap composite, STEEL'S index of iron and steel prices is up 10 cents to $35.18. The finished steel index is unchanged at $53.90.

Reinforcing Bars Will Advance

HIGHER steel prices have undergone tests already in certain materials, notably in manufacturers and merchant wire products. Reinforcing bars will be advanced $3 a ton on all specific jobs which are closed after Dec. 23. An announcement on skelp prices still is awaited.

Tin plate backlogs average around one month on cold-reduced material and about two weeks on hot-reduced plate. Operations currently are at about 98 per cent of capacity.

From New York it is reported that Russia has been a heavy buyer of American sheets recently, with purchases estimated at 25,000 tons and understood to have been placed at the new price levels.

COMPOSITE MARKET AVERAGES

	Dec. 19	Dec. 12	Dec. 5	One Month Ago Nov., 1936	Three Months Ago Sept., 1936	One Year Ago Dec., 1935	Five Years Ago Dec., 1931
Iron and Steel	$35.18	$35.08	$34.99	$34.65	$34.15	$33.31	$29.90
Finished Steel	53.90	53.90	53.90	53.90	53.10	53.70	47.74
Steelworks Scrap..	17.21	16.63	16.25	16.05	16.18	13.17	8.16

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Dec. 19, 1936	Nov. 1936	Sept. 1936	Dec. 1935
Steel bars, Pittsburgh	2.05c	2.05c	1.95c	1.85c
Steel bars, Chicago	2.10	2.10	2.00	1.90
Steel bars, Philadelphia	2.36	2.36	2.26	2.16
Iron bars, Terre Haute, Ind.	1.95	1.95	1.85	1.75
Shapes, Pittsburgh	1.90	1.90	1.90	1.80
Shapes, Philadelphia	2.11½	2.11½	2.11½	2.01½
Shapes, Chicago	1.95	1.95	1.95	1.85
Tank plates, Pittsburgh	1.90	1.90	1.90	1.80
Tank plates, Philadelphia	2.09	2.09	2.09	1.99
Tank plates, Chicago	1.95	1.95	1.95	1.85
Sheets, No. 10, hot rolled, Pitts.	2.15	1.95	1.95	1.85
Sheets, No. 24, hot ann., Pitts.	2.80	2.50	2.50	2.40
Sheets, No. 24, galv., Pitts.	3.40	3.20	3.20	3.10
Sheets, No. 10, hot rolled, Gary	2.05	2.05	2.05	1.95
Sheets, No. 24, hot anneal., Gary	2.70	2.70	2.60	2.50
Sheets, No. 24, galvan., Gary	3.30	3.30	3.30	3.20
Plain wire, Pittsburgh	2.60	2.50	2.40	2.30
Tin plate, per base box, Pitts.	4.85	5.25	5.25	5.25
Wire nails, Pittsburgh	2.25	2.05	1.95	2.40

Semifinished Material

Sheet bars, open-hearth, Youngs.	$32.00	$32.00	$30.00	$30.00
Sheet bars, open-hearth, Pitts.	32.00	32.00	30.00	30.00
Billets, open-hearth, Pittsburgh	32.00	32.00	30.00	29.00
Wire rods, No. 5 to ⅜-inch, Pitts.	40.00	40.00	38.00	38.00

Pig Iron

	Dec. 19, 1936	Nov. 1936	Sept. 1936	Dec. 1935
Bessemer, del. Pittsburgh	$21.8132	21.0632	20.8132	20.81
Basic, Valley	20.00	19.25	19.00	19.00
Basic, eastern del. East. Pa.	21.8132	21.0632	20.8132	20.81
No. 2 fdy., del. Pittsburgh	21.3132	20.5632	20.3132	20.31
No. 2 fdy., Chicago	20.50	19.75	19.50	19.50
Southern No. 2, Birmingham	16.88	15.75	15.50	15.50
Southern No. 2, del. Cincinnati	20.44	19.69	19.44	20.2007
No. 2X eastern, del. Phila.	22.6882	21.9382	21.6882	21.68
Malleable, Valley	20.50	19.75	19.50	19.50
Malleable, Chicago	20.50	19.75	19.50	19.50
Lake Sup., charcoal, del. Chicago	26.2528	26.8750	25.2528	25.2528
Gray forge, del. Pittsburgh	20.6741	19.9241	19.6741	19.67
Ferromanganese, del. Pittsburgh	85.13	80.13	80.13	90.13

Scrap

Heavy melting steel, Pittsburgh	$19.00	$17.40	$17.75	$14.06
Heavy melt. steel, No. 2, east. Pa.	14.25	13.75	14.00	11.25
Heavy melting steel, Chicago	17.25	16.50	16.15	13.35
Rail for rolling, Chicago	17.75	17.25	16.75	14.50
Railroad steel specialties, Chicago	19.25	18.25	17.65	14.25

Coke

Connellsville furnace, ovens	$4.00	$4.00	$3.90	$3.55
Connellsville, foundry, ovens	4.50	4.25	4.25	4.10
Chicago, by-product foundry, del.	9.75	9.75	9.75	9.75

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Quotations include first quarter price advances on sheets, strip and wire, most mills now declining tonnage at former prices; $3 per ton advance on plates, shapes, bars and $2 on semifinished are not yet general.

Sheet Steel

Prices Subject to Quantity Extras and Deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.15c
Gary	2.25c
Chicago, delivered	2.28c
Detroit, del.	2.35c
New York, del.	2.50c
Philadelphia, del.	2.46c
Birmingham	2.30c
St. Louis, del.	2.48c
Pacific ports, f.o.b. cars, dock	2.90c

Hot Rolled Annealed No. 24

Pittsburgh	2.80c
Gary	2.90c
Chicago, delivered	2.93c
Detroit, delivered	3.00c
New York, del.	3.15c
Philadelphia, del.	3.11c
Birmingham	2.95c
St. Louis, del.	3.135c
Pacific ports, f.o.b. cars, dock	3.45c

Galvanized No. 24

Pittsburgh	3.40c
Gary	3.50c
Chicago, delivered	3.53c
Philadelphia, del.	3.71c
New York, delivered	3.75c
Birmingham	3.55c
St. Louis, del.	3.735c
Pacific ports, f.o.b. cars, dock	4.00c

Tin Mill Black No. 28

Pittsburgh	2.95c
Gary	3.05c
St. Louis, delivered	3.28c

Cold Rolled No. 10

Pittsburgh	2.80c
Gary	2.90c
Detroit, delivered	3.00c
Philadelphia, del.	3.11c
New York, del.	3.15c
Pacific ports, f.o.b. cars, dock	3.40c

Cold Rolled No. 20

Pittsburgh	3.25c
Gary	3.35c
Detroit, delivered	3.45c
Philadelphia, del.	3.56c
New York, del.	3.60c

Enameling Sheets

Pittsburgh, No. 10	2.60c
Pittsburgh, No. 20	3.20c
Gary, No. 10	2.70c
Gary, No. 20	3.30c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base (box) Pittsburgh	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.50c
Do., Gary	3.60c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plate

Pittsburgh	1.90c
New York, del.	2.19c
Philadelphia, del.	2.09c
Boston, delivered	2.32c
Buffalo, delivered	2.15c
Chicago or Gary	1.95c
Cleveland, del.	2.09½c
Birmingham	2.05c
Coatesville, base	2.00c
Sparrows Pt., base	2.00c
Pacific ports, f.o.b. cars, dock	2.45c
St. Louis, delivered	2.18c

Structural Shapes

Pittsburgh	1.90c
Philadelphia, del.	2.11½c
New York, del.	2.16½c
Boston, delivered	2.30½c
Bethlehem	2.00c
Chicago	1.95c
Cleveland, del.	2.10c
Buffalo	2.00c
Gulf Ports	2.30c
Birmingham	2.05c
Pacific ports, f.o.b. cars, dock	2.45c

Bars

Soft Steel
(Base, 3 to 25 tons)

Pittsburgh	2.05c
Chicago or Gary	2.10c
Duluth	2.20c
Birmingham	2.20c
Cleveland	2.10c
Buffalo	2.15c
Detroit, delivered	2.20c
Pacific ports, f.o.b. cars, dock	2.60c
Philadelphia, del.	2.36c
Boston, delivered	2.47c
New York, del.	2.40c
Pitts., forg. qual.	2.40c

Rail Steel
To Manufacturing Trade

Pittsburgh	1.90c
Chicago or Gary	1.95c
Moline, Ill.	1.95c
Cleveland	1.95c
Buffalo	2.00c

Iron

Terre Haute, Ind.	1.95c
Chicago	2.00c
Philadelphia	2.26c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. car docks	2.45c
Philadelphia, del.	2.26c-2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; less carloads $4 higher; less carloads fencing $5 over base column.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.25
Cement coated nails	$2.25
Galv. nails, 15 gage and finer	$3.25
do. finer than 15 ga.	$4.75

(Per pound)

Polished staples	2.95c
Galv. fence staples	3.20c
Barbed wire, galv.	2.75c
Annealed fence wire	2.90c
Galv. fence wire	3.30c
Woven wire fencing (base column, c. l.)	$63.00

To Manufacturing Trade

Plain wire, 6-9 ga.	2.60c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pitts. or Cleveland	3.20c

Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination

•10,000 to 19,000 lbs.	2.35c
•20,000 to 59,999 lbs.	2.30c
•60,000 to 99,999 lbs.	2.25c
•100,000 to 299,999 lbs.	2.22½c
•300,000 lbs. and over	2.20c

Gary, Ind., Cleve., Chi., up 5c; Buffalo, up 10c; Detroit, up 15c; eastern Michigan, up 20c.

Alloy Steel Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.55c

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20
4100 0.15 to 0.25 Mo.			0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni			1.05
5100 0.80-1.10 Cr.			0.45
5100 Cr. spring			base
6100 bars			1.10
6100 spring			0.70
Cr., Ni., Van.			1.40
Carbon Van.			0.85
9200 spring flats			base
9200 spring rounds, squares			0.25

Piling

Pittsburgh	2.25c
Chicago, Buffalo	2.35c

Strip and Hoops

(Base, hot rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23¾-in.	
Pittsburgh	2.15c
Chicago or Gary	2.25c
Birmingham base	2.30c
Detroit, del.	2.35c
Philadelphia, del.	2.46c
New York, del.	2.50c
Cooperage hoop,	
•Pittsburgh	2.15c
•Chicago	2.25c
Cold strip, 0.25 carbon and under,	
Pitts., Cleveland	2.85c
Detroit, del.	3.06c
Worcester, Mass.	3.05c

Carbon	Cleve-Pitts.	Worcester, Mass.
0.26—0.50	2.85c	3.05c
0.51—0.75	3.70c	3.90c
0.76—1.00	5.45c	5.65c
Over 1.00	7.50c	7.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$39.00
Relay rails, Pitts. 20—100 lbs.	25.50-28.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Pitts., So. Chi.	2.70c
Do., axle steel	2.10c
Spikes, R. R. base	2.90c
Track bolts, base	4.00c
Tie plates, base	2.10c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $2; 16 and 20 lbs., up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:

Carriage and Machine

½ x 6 and smaller	70 off
Do. larger	65-10 off
Tire bolts	50 off

Plow Bolts

All sizes	65-10 off

Stove Bolts

In packages with nuts attached 72½ off; in packages with nuts separate 75-5 off; in bulk 81½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	60 off
Elevator bolts	60 off

Nuts

S. A. E. semifinished hex.:	
⅛ to 7/16-inch	60-20-5 off
Do., ½ to 1-inch	60-20-5 off
Do., over 1-inch	60-20-5 off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	3.25c
Struc., c. l., Chicago	3.35c
7/16-in. and smaller, Pitts., Chi., Cleve.	70-5 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs.	$6.00 off

Cut Nails

Cut nails, Pitts.; (10% discount of size extras)	$2.90
Do., less carloads, 5 kegs or more, no discount on size extras	$3.20
Do., under 5 kegs; no disc. on size extras	$3.35

Pipe and Tubing

Base $200 net ton, except on less boiler tubes under 2 inches and cold drawn seamless.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
⅛ and ¼	60	44½
⅜	64½	55
½	67½	59
¾	69½	61½
1—3	31½	15

Iron

⅛	36½	20½
¼	39½	25½
⅜	41½	26
½	62	53½
¾	65	56½
1—1¼	67	58½
1½—2	66	56½
2½—3	65½	56
3½—6	37	22½
7 and 8	38	25
9 and 10	40	28½

Lap Weld

Steel

2	62	53½
2½—3	65	56½
3½—6	67	58½
7 and 8	66	56½
9 and 10	65½	56

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel

⅛, butt weld	56
¼ and ⅜, butt weld	59
½, butt weld	63½
¾, butt weld	66½
1 to 3, butt weld	68½
2, lap weld	61
2½ to 3, lap weld	64
3½ to 6, lap weld	66
7 and 8, lap weld	65

Iron

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		Charcoal Iron	
2—2¼	33	1¾	8
2½—2¾	40	2—2¾	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 pts. under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935, card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices being on lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$41.00-42.00
4-in., Birmingham	44.00-45.00
4-in., Chicago	52.40-53.40
6 to 24-in., Chicago	49.40-50.40
6-in. & over, east. fdy.	45.00
Do., 4-in.	46.00

Class A pipe $3 over Class B
Stnd. fitgs., Birm. base $100.00

Semifinished Steel

Billets and Blooms

4 x 4-*inch base; gross ton*

•Pitts., Chi., Cleve., Buffalo and Young.	$34.00
Philadelphia	37.67
Duluth	34.00

Forging Billets

6 x 6 to 9 x 9-*in., base*

•Pitts., Chicago, Buffalo	40.00
Forging, Duluth	41.00

Sheet Bars

•Pitts., Cleve., Young., Sparrows Point	34.00

Slabs

•Pitts., Chicago, Cleveland, Youngstown	$34.00

Wire Rods

Pitts., Cleve., No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to 11/16-inch incl.	45.00

Chicago up $1; Worcester up $2

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.80c

Coke

Price Per Net Ton

Beehive Ovens

•Connellsville, fur.	$3.90-4.10
•Connellsville, fdry.	4.50-4.75
Connell. prem. fdry.	5.50
New River fdry.	6.00
Wise county fdry.	4.45-5.00
Wise county fur.	4.00-4.50

By-Product Foundry

Newark, N. J., del.	10.20-10.65
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del.	12.00
St. Louis, del.	10.00-10.50
Birmingham, ovens	6.50
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.70
Philadelphia, del.	9.88

Coke By-Products

Spot gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford

Phenol (200 lb. drums)	15.50c
Do., (450 lbs.)	14.50c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	8.25c

Per 100 lbs. Atlantic seaboard

Sulphate of ammonia	$1.30

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$21.50	$22.00	$21.00	$22.50
Birdsboro, Pa.	21.50	22.00	21.00	22.50
Birmingham, Ala.‡	16.88	.....	15.88	22.00
Buffalo	20.50	21.00	19.50	21.50
Chicago	20.50	20.50	20.00	21.00
Cleveland	20.50	20.50	20.00	21.00
Detroit	20.50	20.50	20.00	21.00
Duluth	21.00	21.00	.....	21.50
Erie, Pa.	20.50	21.00	20.00	21.50
Everett, Mass.	22.75	23.25	22.25	23.75
Hamilton, O.	20.50	20.50	20.00	.....
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	20.50	20.50	20.00	21.00
Provo, Utah	18.50	.....	18.00	.....
Sharpsville, Pa.	20.50	20.50	20.00	21.00
Sparrows Point, Md.	21.50	.....	21.00	.....
Swedeland, Pa.	21.50	22.00	21.00	22.50
Toledo, O.	20.50	20.50	20.00	21.00
Youngstown, O.	20.50	20.50	20.00	21.00

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	21.76	21.76	21.26	22.26
Baltimore from Birmingham	22.08	.....	20.96	.....
Boston from Birmingham	21.62	.....	21.50	.....
*Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	22.00	22.50	21.50	23.00
Brooklyn, N. Y., from Bethlehem	23.93	24.43	.....	.....
Brooklyn, N. Y., from Bmghm.	23.55	.....	.....	.....
Canton, O., from Cleveland	21.76	21.76	21.26	22.26
Chicago from Birmingham	†20.72	.....	20.60	.....
Cincinnati from Hamilton, O.	20.82	21.58	21.08	.....
Cincinnati from Birmingham	20.44	.....	19.82	.....
Cleveland from Birmingham	20.62	.....	20.12	.....
Cincinnati from Hamilton, O.	22.17	22.77	22.27	.....
Mansfield, O., from Toledo, O.	22.26	22.26	21.76	22.76
Milwaukee from Chicago	21.57	21.57	21.27	22.07
Muskegon, Mich., from Chicago, Toledo or Detroit	23.60	23.60	23.10	24.10
Newark, N. J., from Birmingham	22.61	.....	.....	.....
Newark, N. J., from Bethlehem	22.99	23.49	.....	.....
Philadelphia from Birmingham	21.93	.....	21.81	.....
Philadelphia from Swedeland, Pa.	22.31	22.81	21.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	22.75	22.75	22.25	22.25
St. Louis, northern	21.00	21.00	20.50	.....

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis from Birmingham	†20.68	.....	20.50	.....
St. Paul from Duluth	22.94	22.94	.....	23.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $25.00, Phila. base, standard and copper bearing, $26.13.

Gray Forge		Charcoal	
Valley furnace	$20.00	Lake Superior fur.	$23.00
Pitts. dist. fur.	20.00	do., del. Chicago	26.25
		Lyles, Tenn.	23.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $24.00; 6.51-7—$24.50; 7-7.50—$25.00; 7.51-8—$25.50; 8-8.50—$26.00; 8.51-9—$26.50; 9-9.50—$27.00; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $55.00

First Quality

Pa., Ill., Md., Mo., Ky. ... $45.00
Alabama, Georgia .. $38.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo. ... 40.00
Georgia, Alabama 35.00

Ohio

First quality $40.00
Intermediary 37.00
Second quality 28.00

Malleable Bung Brick

All bases 50.00

Silica Brick

Pennsylvania $45.00
Joliet, E. Chicago 54.00
Birmingham, Ala. 48.00

Ladle Brick (Dry Press)

Pa., O., W. Va., Mo. $24.00
do., wire cut 22.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags) .. $45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags) .. 40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk) .. 22.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick $45.00
Chem. bonded chrome .. 45.00
Magnesite brick 65.00
Chem. bonded magnesite 55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton $23.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $18.00
Do., for barge $19.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid .. 80.00
Do., Baltimore, base .. 80.00
Do., del. Pittsburgh .. 85.13
Spiegeleisen, 19-20% dom. Palmerston, Pa., spot. †28.00
Do., New Orleans 28.00
Ferrosilicon, 50% freight allowed, c. l. 69.50
Do., less carload 77.00
Do., 75 per cent 126-130.00
Spot, $5 a ton higher.
Silicoman., 2½ carbon .. 89.00
2% carbon, 94.00; 1%, 104.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. 10.00
Ferrotungsten, stand., lb. con. del. 1.30-1.40
Ferrovanadium, 35 to 40% lb., cont. 2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. all., net ton 137.50
Spot, 1 ton, frt. allow., lb. 7.00
Do., under 1 ton 7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $3 unitage 58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $3 unitage .. 75.00
Ferromolybdenum, stand. 55-65%, lb. 0.95
Molybdate, lb. cont. 0.80
†Carloads. Quan. diff. apply

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper			Straits Tin		Lead						
	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	New York Spot	New York Futures	East N. Y.	East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Dec. 12	10.50	10.62½	10.12½	51.75	51.25	5.30	5.15	5.15	*19.00	12.75	35.00
Dec. 14	11.00	11.12½	10.62½	51.75	51.40	5.40	5.25	5.25	*19.00	12.75	35.00
Dec. 15	11.00	11.12½	10.62½	52.75	52.30	5.50	5.35	5.35	*19.00	12.75	35.00
Dec. 16	11.00	11.12½	10.62½	52.75	52.45	5.50	5.35	5.35	*19.00	12.75	35.00
Dec. 17	11.00	11.12½	10.62½	52.65	52.20	5.50	5.35	5.45	*19.00	12.75	35.00
Dec. 18	11.00	11.12½	10.62½	52.25	51.90	5.50	5.35	5.45	*19.00	12.75	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.00c Conn. copper

Sheets

*Yellow brass (high) 16.75
*Copper, hot rolled 18.75
*Lead, cut to jobbers 9.00
*Zinc, 100-lb. base 10.00

Tubes

*High yellow brass 19.00
*Seamless copper 19.25

Rods

*High yellow brass 14.75
*Copper, hot rolled 15.50

Anodes

*Copper, untrimmed 16.25

Wire

*Yellow brass (high) 17.00

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass

*New York 8.00-8.12½
*Cleveland 7.75- 8.00
*Chicago 7.50- 7.75
*St. Louis 7.25- 7.50

Heavy Copper and Wire

*New York, No. 1 ... 9.25- 9.50
*Chicago, No. 1 ..8.87½-9.12½
*Cleveland, No. 1 .. 9.00- 9.25
*St. Louis, No. 1 .... 8.75- 9.00

Composition Brass Borings

*New York 7.37½- 7.50

Light Copper

*New York 8.25-8.37½
*Chicago 7.37½-7.62½
*Cleveland 7.00- 7.25
*St. Louis 7.00- 7.25

Light Brass

*Chicago 4.75- 5.00
*Cleveland 4.50- 4.75
*St. Louis 4.25- 4.50

Lead

*New York 4.90- 5.00
*Cleveland 4.25- 4.50
*Chicago 4.25- 4.50
*St. Louis 4.25- 4.50

Zinc

*New York 3.00- 3.25
*St. Louis 2.75- 3.25
*Cleveland 2.75- 3.00

Aluminum

Borings, Cleve. 9.75-10.00
Mixed, cast, Cleve. .. 13.25-13.50
Mixed, cast St. L. ... 13.00-13.25
Clips, soft, Cleve. 14.75-15.00

SECONDARY METALS

*Brass ingot, 85-5-5-5, l.c.l. 11.25
Stand. No. 12 alum. 16.75-17.25

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham†	12.50-13.50
Bos. dock, No. 1, exp.	†12.50
N. Eng. del. No. 1	13.25
Buffalo, No. 1	16.00-17.00
Buffalo, No. 2	15.00-15.50
Chicago, No. 1	17.00-17.50
Cleveland, No. 1	17.00-17.50
Cleveland, No. 2	16.00-16.50
Detroit, No. 1	14.00-14.50
Eastern Pa., No. 1	15.50-16.00
Eastern Pa., No. 2	14.00
Federal, Ill.	14.00-14.50
Granite City, R. R.	15.50-16.00
Granite City, No. 2	14.00-14.50
New York, No. 1	†11.50-12.25
N. Y. dock, No. 1 exp.	†11.25-11.75
Pitts., No. 1 (R. R.)	19.25-19.75
Pitts., No. 1 (dlr.)	18.75-19.25
Pittsburgh, No. 2	17.00-17.50
St. Louis, R. R.	16.25-16.75
St. Louis, No. 2	14.00-14.50
Toronto, dlrs. No. 1	10.50-11.00
Toronto, No. 2	9.50-10.00
Valleys, No. 1	17.75-18.25

COMPRESSED SHEETS

Buffalo, dealers	15.00-15.50
Chicago, factory	16.25-16.75
Chicago, dealer	14.00-14.50
Cleveland	16.50-17.00
Detroit	14.25-14.75
E. Pa., new mat.	15.50-16.00
E. Pa., old mat.	13.00
Pittsburgh	18.75-19.25
St. Louis	12.00-12.50
Valleys	17.50-17.75

BUNDLED SHEETS

Buffalo	13.00-13.50
Cincinnati, del.	11.00-11.50
Cleveland	13.50-14.50
Pittsburgh	17.00-17.50
St. Louis	10.00-10.50
Toronto, dealers	4.50

SHEET CLIPPINGS, LOOSE

Chicago	11.50-12.00
Cincinnati	10.00-10.50
Detroit	11.00-11.50
St. Louis	9.50-10.00

STEEL RAILS, SHORT

Birmingham	15.00-16.00
Buffalo	19.00-19.50
Chicago (3 ft.)	19.00-19.50
Chicago (2 ft.)	20.50-21.00
Cincinnati, del.	18.50-19.00
Detroit	17.50-18.00
Pitts., open-hearth, 3 ft. and less	22.00-22.50
St. Louis, 2 ft. & less	17.00-17.50

STEEL RAILS, SCRAP

Boston district	†11.75-12.00
Buffalo	16.50-17.00
Chicago	17.00-17.50
Pittsburgh	19.25-19.75
St. Louis	16.00-16.50
Toronto, dealers	8.50

STOVE PLATE

Birmingham	8.50- 9.00
Boston district	†7.75- 8.25
Buffalo	13.00-13.50
Chicago	9.00- 9.50
Cincinnati, dealers	10.25-10.75
Detroit, net	9.50-10.00
Eastern Pa.	13.50-14.00
New York, fdry.	†10.00
St. Louis	10.00-10.50
Toronto, deal'rs, net	5.50- 6.00

SPRINGS

Buffalo	18.00-18.50
Chicago, leaf	19.00-19.50
Chicago, coil	21.50-22.00
Eastern Pa.	20.50-21.00
Pittsburgh	23.00-23.50
St. Louis	18.00-18.50

ANGLE BARS—STEEL

Chicago	19.00-19.50
St. Louis	16.75-17.25
Buffalo	14.50-15.00

RAILROAD SPECIALTIES

Chicago	19.00-19.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	19.00-20.00
Cleveland, billet, bloom crops	21.00-21.50
Eastern Pa., crops	21.50
Pittsburgh, billet, bloom crops	23.00-23.50
Pittsburgh, sheet bar crops	21.50-22.00

FROGS, SWITCHES

Chicago	17.00-17.50
St. Louis, cut	16.00-16.50

SHOVELING STEEL

Chicago	17.00-17.50
Federal, Ill.	14.00-14.50
Granite City, Ill.	14.00-14.50
Toronto, dealers	6.50

RAILROAD WROUGHT

Birmingham	9.00-10.00
Boston, district	†8.00- 8.25
Buffalo, No. 1	15.00-15.50
Buffalo, No. 2	16.00-16.50
Chicago, No. 1, net	15.00-15.50
Chicago, No. 2	17.00-17.50
Cincinnati, No. 2	15.50-16.00
Eastern Pa.	16.50-17.00
St. Louis, No. 1	13.50-14.00
St. Louis, No. 2	16.00-16.50
Toronto, No. 1 dlr.	7.00

SPECIFICATION PIPE

Eastern Pa.	15.00
New York	†10.00-10.50

BUSHELING

Buffalo, No. 1	15.00-15.50
Chicago, No. 1	15.50-16.00
Cincin., No. 1, deal.	12.25-12.75
Cincinnati, No. 2	7.50- 8.00
Cleveland, No. 2	12.00-12.50
Detroit, No. 1, new	13.00-13.50
Valleys, new, No. 1	17.00-17.50
Toronto, dealers	6.00

MACHINE TURNINGS

Birmingham	6.00- 6.50
Buffalo	9.75-10.25
Chicago	8.50- 9.00
Cincinnati, dealers	8.50- 9.00
Cleveland	11.00-11.50
Detroit	9.00- 9.50
Eastern Pa.	10.50-11.00
New York	†5.00- 5.50
Pittsburgh	13.50-14.00
St. Louis	7.25- 7.75
Toronto, dealers	4.00- 4.50
Valleys	10.75-11.25

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†6.40- 7.75
Buffalo	10.25-10.75
Cincinnati, dealers	7.50- 8.00
Cleveland	12.00-12.50
Detroit	9.50-10.00
Eastern Pa.	9.00- 9.50
New York	†6.00
Pittsburgh	14.00-14.50
Toronto, dealers	4.00

CAST IRON BORINGS

Birmingham	6.00- 6.50
Boston dist. chem.	†7.00- 7.25
Boston dist. for mills	†7.50- 7.75
Buffalo	10.25-10.75
Chicago, dealers	8.75- 9.25
Cincinnati, dealers	7.50- 8.00
Cleveland	12.00-12.50
Detroit	9.50-10.00
E. Pa., chemical	10.50-13.00
New York	5.75- 6.25
St. Louis	8.00- 8.50
Toronto, dealers	4.50- 5.00

PIPE AND FLUES

Cincinnati, dealers	9.75-10.25
Chicago, net	8.00- 8.50

RAILROAD GRATE BARS

Buffalo	11.00-11.50
Chicago, net	11.50-12.00
Cincinnati	10.25-10.75
Eastern Pa.	13.50-14.00
New York	†8.00- 8.50
St. Louis	11.50-12.00

FORGE FLASHINGS

Boston district	†11.00-11.25
Buffalo	15.00-15.50
Cleveland	16.00-16.50
Detroit	12.50-13.00
Pittsburgh	17.00-17.50

FORGE SCRAP

Boston district	†6.50- 7.00
Chicago, heavy	19.00-19.50
Eastern Pa.	14.00-14.50

ARCH BARS, TRANSOMS

St. Louis	16.50-17.00

AXLE TURNINGS

Boston district	†7.50- 8.00
Buffalo	13.00-13.50
Chicago, elec. fur.	16.50-17.00
Eastern Pa.	14.00-14.50
St. Louis	11.00-11.50
Toronto	4.50

STEEL CAR AXLES

Birmingham	15.50-16.00
Boston district	†16.00-16.25
Buffalo	19.00-19.50
Chicago, net	19.50-20.00
Eastern Pa.	21.50
St. Louis	19.00-19.50
Toronto	8.50

SHAFTING

Boston district	†16.00-16.25
Eastern Pa.	21.50-22.00
New York	†15.50-16.00
St. Louis	15.00-15.50

CAR WHEELS

Birmingham	15.00-15.50
Boston dist. iron	†11.00-11.50
Buffalo, iron	16.50-17.00
Buffalo, steel	18.50-19.50
Chicago, iron	18.00-18.50
Chicago, rolled steel	19.00-19.50
Cincinnati, iron	14.75-15.25
Eastern Pa., iron	18.00-18.50
Eastern Pa., steel	20.50-21.00
Pittsburgh, iron	18.75-19.25
Pittsburgh, steel	23.00-23.50
St. Louis, iron	15.25-15.75
St. Louis, steel	17.75-18.25
Toronto, net	8.50

NO. 1 CAST SCRAP

Birmingham	13.75-14.50
Bos. dis. No. 1 mach.	†11.25-12.00
N. Eng., del. No. 2	†9.00- 9.50
N. Eng., del. textile	13.00
Buffalo, cupola	15.00-15.50
Buffalo, mach.	16.00-16.50
Chicago, agri. net	12.50-13.00
Chicago, auto	12.50-13.00
Chicago, mach. net	14.50-15.00
Chicago, railr'd net	13.50-14.00
Cinci., mach. cup.	15.25-15.75
Cleveland, mach.	17.50-18.00
Eastern Pa., cupola	17.50
E. Pa., mixed yard	14.00-14.50
Pittsburgh, cupola	17.50-18.00
San Francisco, del.	13.50-14.00
Seattle	10.00-11.00
St. Louis, No. 1	13.25-13.75
St. L. No. 1, mach.	13.50-14.00
Toronto, No. 1, mach., net	9.50-10.00

HEAVY CAST

Boston, dist. break.	†10.50-11.00
New England del.	11.00-11.50
Buffalo, break.	13.50-14.00
Cleveland, break	13.50-14.00
Detroit, No. 1 mach. net	13.50-14.00
Detroit, break.	11.50-12.00
Detroit, auto net	13.50-14.00
Eastern Pa.	16.00-16.50
New York, break.	†11.50-12.00
Pittsburgh	15.00-15.50

MALLEABLE

Birmingham, R. R.	14.00-14.50
New England, del.	†16.25-17.50
Buffalo	17.00-17.50
Chicago, R. R.	19.50-20.00
Cinci., agri. del.	14.75-15.25
Cleveland, rail.	18.00-18.50
Detroit, auto, net	14.50-15.00
Eastern Pa., R. R.	17.00-18.00
Pittsburgh, rail	18.50-19.00
St. Louis, R. R.	16.50-17.00
Toronto, net	7.00

RAILS FOR ROLLING

5 feet and over

Birmingham	15.00-15.50
Boston	†11.00-11.50
Buffalo	17.50-18.50
Chicago	17.50-18.00
Eastern Pa.	18.50-19.00
New York	†12.00-12.50
St. Louis	17.00-17.50

LOCOMOTIVE TIRES

Chicago (cut)	19.00-19.50
St. Louis, No. 1	14.50-15.00

LOW PHOS. PUNCHINGS

Buffalo	18.50-19.00
Chicago	20.50-21.00
Eastern Pa.	20.50-21.00
Pittsburgh (heavy)	21.50-22.00
Pittsburgh (light)	21.00-21.50

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.50- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	13.50
No. Afr. low phos.	13.50
Swedish low phos.	11.50
Spanish No. Africa basic, 50 to 60%	12.50
Tungsten, spot sh. ton unit, duty pd.	$15.85-16.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.50-19.75

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	30.00
So. African, 50-52%	30.00
Indian, 50-52%	30.00

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.10c
Chattanooga	3.56c
Chicago (j)	3.20c
Cincinnati	3.42c
Cleveland	3.10c
Detroit	3.29c
Houston	3.10c
Los Angeles	3.80c
Milwaukee	3.31c-3.46c
New Orleans	3.70c
New York‡ (d)	3.51c
Pitts. (h)	3.15c-3.30c
Philadelphia*	3.25c
Portland	3.70c
San Francisco	3.85c
Seattle	4.05c
St. Louis	3.45c
St. Paul	3.45c-3.60c
Tulsa	3.35c

IRON BARS

Portland	3.50c
Chattanooga	3.56c
Baltimore*	3.10c
Cincinnati	3.42c
New York‡ (d)	3.15c
Philadelphia*	3.25c
St. Louis	3.45c
Tulsa	3.35c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.56c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Angl., cl.	2.45c
New Orleans	*2.67c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.65c
St. Louis	3.35c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	3.10c
Boston††	3.29c
Buffalo	3.35c
Chattanooga	3.66c
Chicago	3.30c
Cincinnati	3.52c
Cleveland	3.41c
Detroit	3.52c
Houston	3.10c
Los Angeles	3.80c
Milwaukee	3.41c
New Orleans	3.80c
New York‡ (d)	3.47c
Philadelphia*	3.10c
Pittsburgh (h)	3.25c
Portland (l)	3.75c
San Francisco	3.75c
Seattle (l)	3.90c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.60c

PLATES

Baltimore*	3.10c
Boston††	3.31c
Buffalo	3.47c
Chattanooga	3.66c
Chicago	3.30c
Cincinnati	3.52c
Cleveland, ¼-in. and over	3.41c
Detroit	3.52c
Detroit, ⅜-in.	3.85c
Houston	3.10c
Los Angeles	3.60c
Milwaukee	3.41c
New Orleans	3.80c
New York‡ (d)	3.50c
Philadelphia*	3.10c
Phila. floor	4.95c
Pittsburgh (h)	3.25c
Portland	3.75c
San Francisco	3.75c
Seattle	3.90c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.60c

NO. 10 BLUE

Baltimore*	3.20c
Boston (g)	3.40c
Buffalo	3.72c
Chattanooga	3.46c
Chicago	3.15c
Cincinnati	3.32c
Cleveland	3.21c
Det. 8-10 ga.	3.24c
Houston	3.45c
Los Angeles	3.90c
Milwaukee	3.26c
New Orleans	3.85c
New York‡ (d)	3.41c
Portland	3.85c
Philadelphia*	3.20c
Pittsburgh (h)	3.05c
San Francisco	3.95c
Seattle	4.05c
St. Louis	3.40c
St. Paul	3.40c
Tulsa	3.80c

NO. 24 BLACK

Baltimore*†	3.80c
Boston (g)	4.05c
Buffalo	3.35c
Chattanooga*	3.36c
Chicago	3.55c-4.55c
Cincinnati	3.97c
Cleveland	4.01c
Detroit	4.14c
Los Angeles	4.35c
Milwaukee	4.16c
New Orleans*	3.52c
New York‡ (d)	4.10c
Philadelphia*†	3.85c
Pitts.** (h)	3.65c-4.95c
Portland	4.30c
Seattle	4.80c
San Francisco	4.65c
St. Louis	3.30c
St. Paul	4.10c
Tulsa	4.85c

NO. 24 GALV. SHEETS

Baltimore *†	3.90c
Buffalo	4.10c
Boston (g)	4.00c
Chattanooga*	3.96c
Chicago (h)	4.15c-5.15c
Cincinnati	4.82c
Cleveland	4.61c
Detroit	4.82c
Houston	4.50c
Los Angeles	4.60c
Milwaukee	4.76c
New Orleans*	4.32c
New York‡ (d)	4.50c
Philadelphia*†	4.50c
Pitts.** (h)	4.30c-5.55c
Portland	4.60c
San Francisco	5.25c
Seattle	5.25c
St. Louis	4.90c
St. Paul	4.60c
Tulsa	5.20c

BANDS

Baltimore*	3.30c
Boston††	3.40c
Buffalo	3.52c
Chattanooga	3.71c
Chicago	3.40c
Cincinnati	3.57c
Cleveland	3.46c
Detroit, ⅛-in. and lighter	3.49c
Houston	3.35c
Los Angeles	4.30c
Milwaukee	3.51c
New Orleans	4.25c
New York‡ (d)	3.66c
Philadelphia*	3.30c
Pittsburgh (h)	3.30c
Portland	4.35c
San Francisco	4.45c
Seattle	4.55c
St. Louis	3.65c
St. Paul	3.65c
Tulsa	3.55c

HOOPS

Baltimore	3.55c
Boston ††	4.40c
Buffalo	3.52c
Chicago	3.40c
Cincinnati	3.57c
Det., No. 14 and lighter	3.49c
Los Angeles	6.05c
Milwaukee	3.51c
New York‡ (d)	3.66c
Philadelphia*	3.55c
Pittsburgh (h)	3.80c
Portland	5.85c
San Francisco	6.50c
Seattle	5.90c
St. Louis	3.65c
St. Paul	3.65c

COLD FIN. STEEL

Baltimore (c)	3.98c
Boston*	4.15c
Buffalo (h)	3.70c
Chattanooga*	4.38c
Chicago (h)	3.75c
Cincinnati	3.97c
Cleveland (h)	3.75c
Detroit	3.84c
Los Ang. (f) (d)	6.10c
Milwaukee	3.86c
New Orleans	4.55c
New York‡ (d)	3.96c
Philadelphia*	4.01c
Pittsburgh	3.60c
Portland (f) (d)	6.25c
San Fran. (f) (d)	6.30c
Seattle (f) (d)	6.35c
St. Louis	4.00c
St. Paul	4.27c
Tulsa	4.80c

COLD ROLLED STRIP

Boston	3.245c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.22c
Cleveland (b)	3.00c
Detroit	3.18c
New York‡ (d)	3.36c
St. Louis	3.41c

TOOL STEELS

(Applying on or east of Mississippi river west of Mississippi 1c up).

	Base
High Speed	59½c
High carbon, high chrome	39c
Oil hardening	23c
Special tool	21c
Extra tool	17¾c
Regular tool	14½c

Uniform extras apply

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	65
Cleveland	70
Detroit	70
Milwaukee	70
Pittsburgh	65-5

(a) Under 100 lbs. 60 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (l) Under 3 in. (j) Shapes other than rounds, flats, fillet angles. 3.35c.

Prices on heavier lines are subject to new quantity differentials: 399 lbs. and less up 50 cts.; 400 to 3999 lbs., base; 4000 to 7999 lbs., 15 cts., under 8000 to 14,999 lbs., 25 cts. under; 15,000 to 39,999 lbs., 35 cts. under; 40,000 lbs. and over, 50 cts. under. (except Boston).

‡Domestic steel. •Plus quan. extras. ••Under 25 bundles. •†50 or more bundles; †New extras apply ††Base 40,000 lbs., extras on less.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 17

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.28 3 2 6*	$15.25	1 17 6
Basic bessemer	15.28 3 2 6*	11.79	1 9 0
Hematite, Phos. .03-.05	18.34 3 5 0	.....	.....
SEMIFINISHED STEEL			
Billets	$28.73 5 17 6	$19.10	2 7 0
Wire rods, No. 5 gage	43.77 8 19 0	36.61	4 10 0
FINISHED STEEL			
Standard rails	$40.34 8 5 0	$44.74	5 10 0
Merchant bars	1.85c 8 10 0	1.29c	3 10 0
Structural shapes	1.80c 8 5 0	1.48c	4 0 0
Plates, †¼-in. or 5 mm.	1.94c 8 17 6	1.60c to 1.84c	4 7 6 to 5 0 0
Sheets, black, 24 gage or 0.5 mm	2.23c 10 5 0	2.49c	6 15 0††
Sheets, gal., 24 gage, corr.	2.80c 12 15 0	2.76c	7 10 0
Bands and strips	2.08c 9 10 0	1.48c	4 0 0
Plain wire, base	2.30c 10 10 0	1.94c	5 5 0
Galvanized wire, base	2.74c 12 10 0	2.15c	5 17 6
Wire nails, base	2.62c 12 0 0	1.75c	4 15 0
Tin plate, box 108 lbs.	$ 4.58 0 18 9	.....	.....

British ferromanganese $75 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$18.34	3 15 0(a)	$15.69	336	$16.61	490	$25.37	63
Basic bessemer pig iron	18.34	3 15 0(a)	12.14	260	14.53	430	27.99	(b)69.50
Furnace coke	5.26	1 1 6	5.91	127	4.63	137	7.65	19
Billets	29.95	6 2 6	23.68	507	19.60	580	38.86	96.50
Standard rails	1.80c	8 5 0	1.49c	711	1.73c	1,150	2.38c	132
Merchant bars	2.04c	9 7 0	1.50c	695	1.05c	700	1.98c	110
Structural shapes	2.05c	9 7 6	1.43c	680	1.05c	700	1.93c	107
Plates, †¼-in. or 5 mm.	2.11c	9 13 9	1.84c	875	1.28c	850	2.29c	127
Sheets, black	2.62c	12 0 0½	2.42c	1,150‡	1.39c	925‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.05c	14 0 0	3.26c	1,550	2.85c	1,900	6.66c	370
Plain wire	2.18c	10 0 0	2.42c	1,150	1.95c	1,300	3 11c	173
Bands and strips	2.20c	10 2 0	1.62c	770	1.28c	850	2.29c	127

•Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 66.5 per cent over paper sterling.

Bars

Bar Prices, Page 76

Pittsburgh—Bar producers now hold the heaviest backlogs since mid-1929 and unfilled orders will take them well through the first quarter to ship. Makers of bolts, nuts and rivets, as well as the cold-finished bar trade, have been the predominating buyers of bars. Until mills cease accepting business at 2.05c, the higher asking price of 2.20c ostensibly for effect after Jan. 31, has carried little significance.

Cleveland — Producers reported last week they would not be able to book additional tonnage at old prices, except for a few odd grades. Their rolling schedules were now filled through January and on some grades there is little hope of getting the material out during that period. No large orders have been placed at the advanced figures. The alloy bar market has shown sustained activity, due to the encouraging rate of increasing production among auto manufacturers.

Chicago—Most bar mills are unable to accept additional business for delivery before Feb. 1, and on new orders the higher prices scheduled for first quarter are being named. Shipments are heavy and consumption is well maintained, particularly in the automotive, tractor and farm implement industries.

Philadelphia — Commercial bar sellers are falling further behind on schedules as demand continues to pile up prior to the $3 increase in prices. As deliveries become more extended producers are selecting their tonnage with increasing discrimination and it appears possible that some producers will withdraw from the market at present prices before the end of the year.

New York—Sellers of commercial steel bars are accepting tonnage with increasing determination and with indications some mills will soon be out of the market at fourth quarter prices.

Youngstown, O.—Filled-up condition of bar mills on the fourth quarter price basis practically has precluded further orders being received. Consumers have asked such large lots that mills have been forced to distribute allotments as in the case of sheets and strip.

Tin Plate

Tin Plate Prices, Page 76

Pittsburgh—Tin plate mills are heading into the Christmas week with operations averaging around 98 per cent of capacity, not only for this district, but for the entire industry, and have before them a full month's backlog of orders for cold-

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STANDARD OIL COMPANY (Indiana)

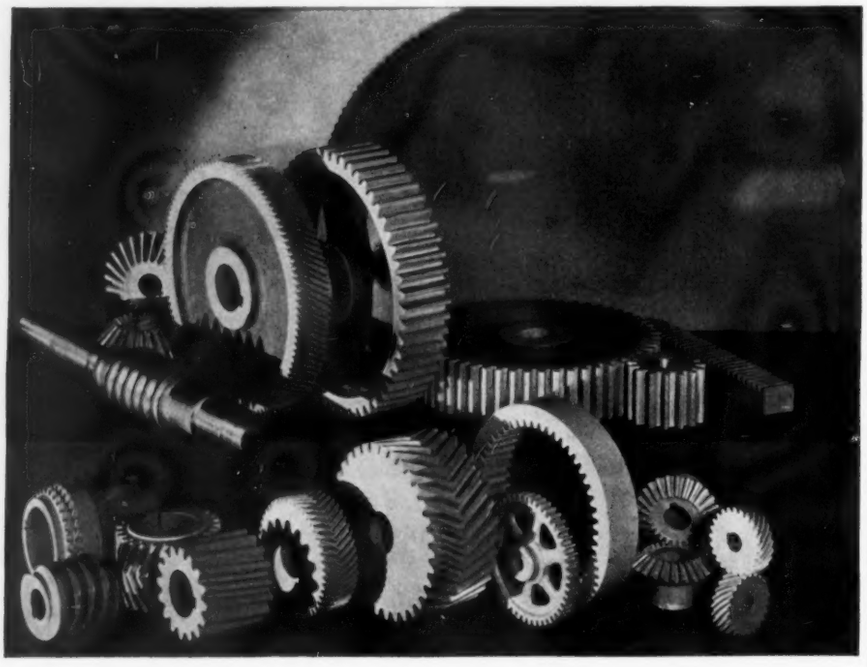
CORRECT LUBRICATION

reduced plate and about two weeks' backlogs on hot plate. Users of tin mill black sheets are still actively placing business at 2.75c, Pittsburgh, hoping to avoid paying the $4 increase which applies on shipments after Feb. 1. The market on standard coke tin plate is holding steady at $4.85 per base box, Pittsburgh.

Cold Finished

Cold Finished Prices, Page 77

Pittsburgh—Several producers of cold-finished steel bars revised their earlier intent of making their price increase immediately effective, as of late November, to permit buyers to enter specifications up to Dec. 30 at the old price of 2.35c, Pittsburgh. Shipments will then be made at mills' convenience. Practically every type of cold-drawn bar user has been taking advantage of this coverage period and orders have in many cases backed up on the mills to the extent that detail work ordinarily accomplished in a day now takes the better part of a week. The situation in another ten days will find cold-drawn bar producers with the heaviest backlogs since wartime.



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Plates

Plate Prices, Page 76

Pittsburgh—Specific building projects with closing dates through January are still being protected at 1.90c, Pittsburgh, base on plates and this protection offer has driven a number of projects to the near-closing stage. Plate mills are attempting wherever possible on the receipt of blanket orders at the present 1.90c price to obtain at least initial specifications so that the possibility of speculative buying can be eliminated as much as possible. The navy department has announced that no action will be taken regarding construction of the large floating dry dock for Hawaii until after congress convenes. The first bid on this project, which will require 43,000 tons, was rejected as being too high. Representatives of both the Mare Island and Puget Sound navy yards have been studying specifications, with the result last week that estimates of the engineers still are higher than the original cost estimate. On Feb. 3 bids will be taken on a smaller dry dock, about 4000 tons, also for Hawaii.

Cleveland—Consumers are still able to place orders at old prices for delivery Feb. 1. However, the price announcements have brought in heavy additional tonnage the last few weeks. The largest order placed recently was for 1500 tons of straight rectangular plates, by the New York Central railroad, for car repair work at its own shops. Republic Steel Corp., Cleveland, will roll the plates. Ship repair work is expected to result in considerable tonnage over the winter months, but as yet relatively small orders have been placed. Rumors persist to the effect that one or two new lake freighters are being contemplated.

Chicago—Recent brisk buying of railroad equipment is adding substantial backlogs to plate producers' books. With additional freight car buying in prospect, heavy shipments of plates are in sight for several months. Miscellaneous plate demand also is active, due in part to higher prices effective for next quarter.

New York—Some plate sellers are now withdrawing from the market at old prices. However, plates are expected to be available from one source or another until the end of the year. Heavy protections against identified work are expected to pro-

vide a good order book in January.

Philadelphia—Plate business continues heavy, particularly where protections on identified structures are concerned.

Ship work in this district includes the placing of 12 sand and gravel barges by the Warner Co., this city, requiring 2500 tons of steel, mostly plates. Six of these barges have been placed with the Ingalls Iron Works Co., Birmingham, Ala., and six with the Dravo Contracting Co., Pittsburgh.

San Francisco—Awards were confined to projects calling for less than 100 tons. To date this year 117,407 tons has been placed, compared with only 51,781 tons for the same period a year ago. Consolidated Steel Corp., Los Angeles, apparently are low bidders on 3192 tons of welded steel pipe for the Crystal Springs pipe line No. 2, San Francisco. Bids have been taken on 1900 tons, including 200 tons of shapes, for a 75 to 123-inch welded steel pipe line for San Gabriel dam No. 1, Los Angeles.

Seattle—Bids for the Pacific Northwest's largest plate job of the year, 8500 tons for a water system improvement at Everett, Wash., were opened Dec. 16. Shops are completing contracts and will be out of work by the end of the month. Prospects are promising for first quarter providing steamship services are resumed meanwhile. Present figures are based on rail shipment of materials which means $10 a ton more than by water.

Contracts Placed

2500 tons, 12 sand and gravel barges, Warner Co., Philadelphia, six to Ingalls Iron Works Co., Birmingham, Ala., and six to Dravo Contracting Co., Pittsburgh.

575 tons, three 55,000-barrel tanks, Globe Oil & Refining Co., Lemont, Ill., to Graver Tank & Mfg. Co., East Chicago, Ind.

205 tons, 10 rundown tanks, Sinclair Refining Co., Parco, Wyo., to Chicago Bridge & Iron Works, Chicago.

120 tons, dredge pipe, Service Supply Co., Akron, O., to Treadwell Engineering Co., Easton, Pa.

Sheets

Sheet Prices, Page 76

Pittsburgh—Practically all mills are sold out for first quarter on sheets. Bookings through the first half of December virtually established a peace-time record. Constant attention is demanded to meet required delivery dates and some observers claim that a genuine test of higher prices will come late in January when sellers begin to exercise their present intent of applying prices with Feb. 1 shipments.

Chicago — New sheet business shows the natural consequence of recent forward buying, and while some spot orders are being received, mills are concentrating principally on delivery. The higher prices are being named on new business, since mills are unable to accept additional tonnages for delivery before February.

Crown Stove Works, Chicago, is low bidder at $361,903.50 for furnishing 10,566 gas ranges of advanced designed for use in 26 PWA slum clearance and low rent housing projects. The stoves are to be fabricated from 18-gage steel, instead of the usual 22-gage, and are to be covered with baked-on porcelain enamel. Weight is 210 pounds.

Cleveland—New business, while showing a slight decline, continues to be booked at the increased prices from consumers seeking preferred deliveries. Considerable forward buying by auto builders has been re-

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ported, some specifying well into first quarter. Enameling, galvanized and electrical sheets continue to show steady activity, in spite of the extensive forward buying reported since the middle of November.

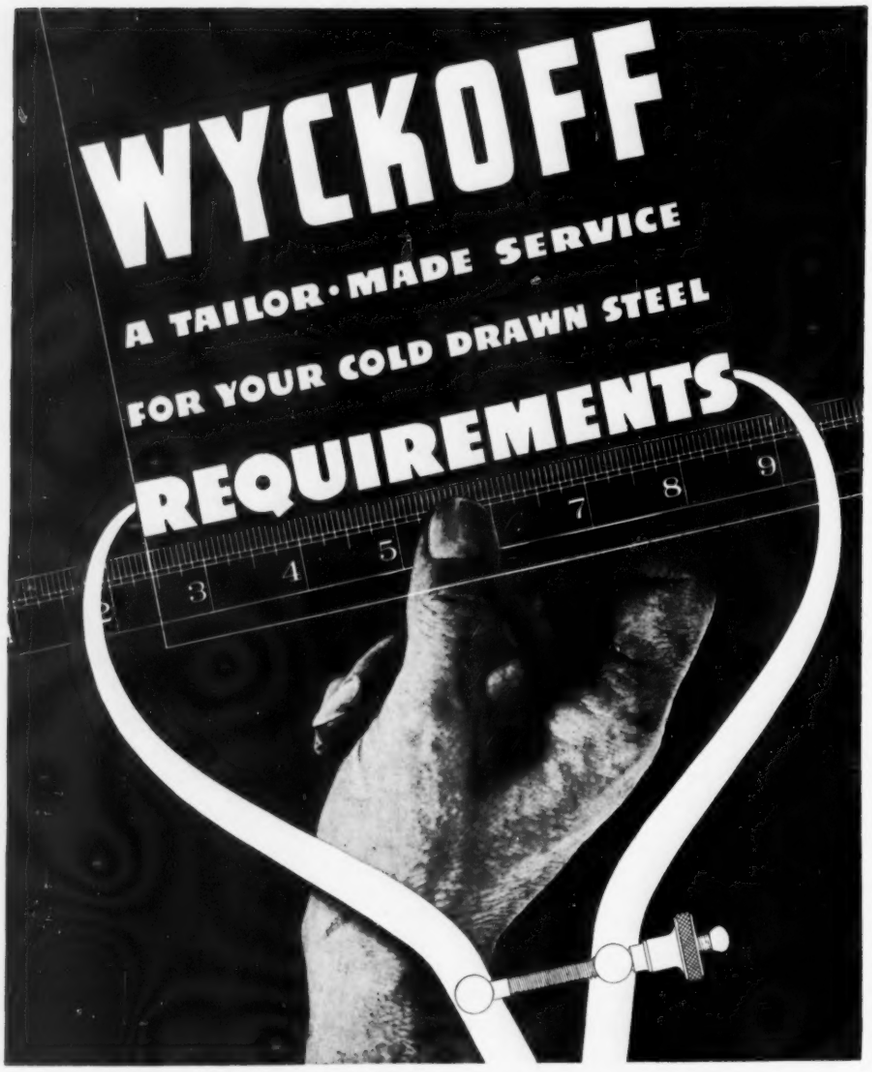
Philadelphia—While sellers generally are out of the market at old prices, they are receiving an increasing volume of new business at the higher prices, as consumers become more concerned over deliveries. Producers are booked weeks ahead on most products and buyers are beginning to specify again so as to obtain the best possible delivery date. Compared with the business closed late in November and early this month before the withdrawal of sellers from the market at fourth quarter prices, present business is light, however.

New York—Russia is a heavy buyer of American sheets, both hot and cold-rolled, with purchases here estimated at 25,000 tons. Russia is inquiring for an additional large tonnage but is said to be meeting difficulty in finding takers. It is understood these purchases are at the new price levels. Domestic demand is holding up well in view of recent heavy coverage.

Cincinnati—Orders for sheets for first quarter delivery at the higher prices are being placed steadily, thus anticipating needs at least six weeks. This demand is broad, even if not heavy in comparison with the flood of fourth quarter buying, but does not help increase the first quarter backlog which developed in connection with price increases. Rolling schedules continue at capacity. Pressure on deliveries persists.

Youngstown, O.—Strict enforcement of tonnage allocation in booking flat-rolled steel products, is resulting in valley mills avoiding speculative purchases. In some cases purchasers are allowed only one-quarter of the tonnage asked. Some district mills will be able to deliver the last of their fourth quarter business by the middle of January; others by the end of the month.

St. Louis—The sheet situation continues tight as to deliveries and producers are exerting every effort to meet deliveries on contracts at fourth quarter prices. Consumption continues at recent high levels and pressure for deliveries is still urgent. Granite City Steel Co. is reported making test runs on its new 4-high sheet mill and expects to have it in production soon.



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Transportation

Track Material Prices, Page 77

Although buying by railroads has subsided from the rate of a fortnight ago the carriers continue to enter the market for cars and locomotives in sufficient number to call for a heavy tonnage of steel.

Inquiries for about 15,000 freight cars were issued in the past week and pending car inquiries total 18,000 to 20,000, involving something like 200,000 tons of steel.

Missouri Pacific shortly is expected to close on 4075 cars of various types, and the Illinois Central is in the market for 2000. Other inquiries include 1150 for the Missouri Kansas Texas and 300 for the Burlington Refrigerator Express.

Bessemer & Lake Erie and Union railroads are expected to announce the award of 2900 freight cars the early part of this week. Bessemer & Lake Erie will close on its inquiry for 2000 freight cars, consisting of 1000 ninety-ton, 500 seventy-ton, and 500 mill-type gondolas. Union railroad at the same time will also place orders for 900 seventy-ton mill-type gondolas.

Last week Bessemer & Lake Erie purchased 10 Texas-type and 2 eight-

wheel switching-type locomotives from American Locomotive Co., New York, at a cost of $1,480,000. The Union at the same time bought four heavy-type switching locomotives at a cost of $429,000 from Baldwin Locomotive Works, Philadelphia.

Tennessee Central has awarded 3000 tons of rails to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Car Orders Placed

Gulf, Mobile & Northern, one high-speed streamlined power-mail-baggage car, two lightweight streamlined trailer coaches and 37 passenger cars, to American Car & Foundry Co., New York.

Delaware & Hudson, sixty 55-ton hopper cars, to own shops; may build 100 forty-ton box cars later.

Norfolk & Western, 1000 steel hoppers, to Bethlehem Steel Co., Bethlehem, Pa.

Rodger Ballast Car Co., 100 seventy-ton steel ballast cars for Denver & Rio Grande Western, to American Car & Foundry Co., New York city.

Virginian Railway, 25 freight cars, to Greenville Steel Car Co., Greenville, Pa.

Western Pacific, 200 box cars, to Mt. Vernon Car Co., Mt. Vernon, Ill.

Western Pacific, fifty 50-ton flat cars, to American Car & Foundry Co., New York.

Car Orders Pending

Burlington Refrigerator Express, 300 refrigerator cars.

Chicago & Northwestern, 23 coaches of Challenger type.

Erie, 750 box cars, 500 automobile cars, 250 gondolas.

Illinois Central, 1000 box cars, 500 coal cars, 500 hopper cars.

Lake Superior & Ishpeming, 100 to 200 50-ton ore cars, bids asked.

Missouri Pacific, 2000 box cars, 2000 gondolas, 50 hopper cars, 25 cabooses.

Missouri Kansas Texas, 500 gondolas, 500 stock cars, 150 automobile cars.

New York, New Haven & Hartford, 75 flat cars, bids to be asked; in addition to 150 low-side coal cars, noted in last week's issue, to be built in the company's own shops.

Pennsylvania, 2500 freight cars.

Locomotives Placed

Bessemer & Lake Erie, 10 Texas-type and two 8-wheel switching locomotives, to American Locomotive Co., New York.

Union railroad, four heavy-transfer switching locomotives, to Baldwin Locomotive Works, Philadelphia.

Rail Orders Placed

Tennessee Central, 3000 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Buses Booked

American Car & Foundry Motors Co., New York, 20 motor coaches, powered with Hall-Scott horizontal engines: Nine for Broad River Power Co., Columbia, S. C.; seven for the Connecticut Co., New Haven, Conn.; one for Norfolk-Southern Bus Corp., Norfolk, Va.; one for Penn-Ohio Coach Lines Co., Youngstown, O.; one for Warwick Coach Lines, Malden, Mass.; and one for Cooke Street Line Inc., Waterbury, Conn.

Semifinished

Semifinished Prices, Page 77

Withdrawal of a number of integrated producers of semifinished steel from the open market continued last week, with the result that nonintegrated mills are finding difficulty arranging supplies and shipments. This condition is especially noticeable in billets and wire rods and to a certain extent in sheet and tin bars, although skelp supplies are by comparison relatively easier to obtain. The market continues on the basis of the fourth-quarter price of $32, Pittsburgh, for billets, blooms, sheet bars and slabs, with the advanced market of $2 a ton expected to become officially recognized before Jan. 1. Wire rods, however, are incorporating their higher prices of $43 and $45 for respective bases. Some wire rod makers have withdrawn temporarily from the open

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market owing to an internal shortage of steel.

Pipe

Pipe Prices, Page 77

Pittsburgh—On inquiries into the first quarter, pipe consumers are finding that sellers of tubular goods have not revised their intention of several weeks ago of quoting unchanged discounts for shipment after Jan. 1. Magnolia Pipe Line Co. is beginning construction on an 85-mile 8-inch welded line from its Tilden station to Corpus Christi, Tex.

Cleveland—Sales so far this month on tubular products have shown some improvement. This is a surprise to many in view of the approaching inventory season and the fact that prices have definitely been extended into first quarter unchanged. However, there is a strong feeling that fittings will be advanced the first quarter of the year. The last adjustment was Nov. 15. The only cast iron job awarded last week was a water main for Upper Arlington, O., to James B. Clow & Son Co., involving 150 tons. The outstanding project pending is for a water distribution development at Canton, O., involving 12,000 feet of 12-inch cast pipe, weighing approximately 810 tons. The $2 a ton advance, base Birmingham, went into effect Dec. 15. The Birmingham price is now $42 a ton.

Chicago—Occasional small orders for cast pipe are being placed, but both new business and shipments are off from the rate of the preceding several months, and little improvement in activity is anticipated during the winter.

New York—Market for cast pipe continues quiet. Shipments are prompt and generally for carload lots. The only identified project of size to come out involves 150 tons for Eastern boulevard, Pelham Bay Park, New York, for the commissioner of water supply, gas and electricity.

San Francisco—Awards of cast pipe for the year 1936 will exceed the total tonnage placed on the Pacific coast during the previous year by over 9000 tons. Pacific States Cast Iron Pipe Co. booked 450 tons of 4 to 10-inch pipe on a contractor's letting at Atwater, Calif., and 143 tons for the treasury department for delivery at Yerington, Nev. Bids have been opened on 325 tons of 6 to 12-inch for Beverly Hills, Calif.

Seattle—Dealers are marking time in the hope 1937 will show a larger volume than the expiring year. New projects, usually numerous at this season, are noticeable by their absence, although in parts this may be attributed to the maritime strike cutting off all shipments.

Cast Pipe Placed

450 tons, 4 to 10-inch, Atwater, Calif., to Pacific States Cast Iron Pipe Co., Provo, Utah.

150 tons, water main, Upper Arlington, O., to James B. Clow & Son Co., Cleveland.

143 tons, 4 to 8-inch, treasury department, Reno, Nev., for delivery at Yerington, Nev., to Pacific States Cast Iron Pipe Co., Provo, Utah.

Cast Pipe Pending

810 tons, 20,000 feet of 12-inch, for water distribution, at Canton, O.

325 tons, 6 to 12-inch, Beverly Hills, Calif.; bids opened.

150 tons, flexible joint cast iron mains, Eastern boulevard in Pelham Bay Park, and East-Chester Bay, New York, for commissioner water supply, gas and electricity, New York city; bids Dec. 29.

150 tons, New York city; Spinbow Construction Co., Brooklyn, N. Y., low.

128 tons, 6-inch, East Bay municipal utility district, Oakland, Calif.; bids Dec. 23.

120 tons, 4 to 24-inch, South Pasadena, Calif.; bids Jan. 13.

Behind the Scenes with STEEL

Interview

FIGHTING our way through STEEL'S editorial department the other day we ran into the fellow who is directing the job of designing and assembling the *Yearbook of Industry* issue, to appear Jan. 4. Sensing a good story we pushed him into a chair and interviewed him regarding this forthcoming stupendous issue. The interview:

"How do things look for the *Yearbook*, my good man?"

"Thirty-three picas bleeding off upper right and top in Persian orange."

"Well, are there a good many interesting articles going to appear in it?"

"Eight and three-quarters by eleven and seven-eighths; mortise in 26 lines of nine on ten, 25 picas wide."

"How about the illustrations and other art work?"

"Five zinc etchings with 21 electrotypes and combination halftones 120-line screen. Now where is my logarithmic scale? Hurry, hurry, hurry!"

"Well, that's interesting. Is it much of a job to put together an issue like this?"

"Nnnnnyahhhhhh! Scram!"

He must have cracked under the strain, so we left him cutting out what appeared to be a paper doll, with a large pair of wicked-looking shears.

* * *

Odds and Ends

FROM *Fluxuations*, published by Foundry Services Inc., New York, we observe that "whole wheat bread contains twice as much iron and copper as white." Probably this refers to white bread and not white lead or whitewash. The same publication says that the Chinese used silver in making ornaments more than 4000 years ago, and that there are only 12 letters in the Hawaiian alphabet.

To which we can only add that STEEL, at $6 for two years, is the greatest value in the business paper field.

* * *

Engineers Cavort

TWO unsuspecting seniors from Bronxville, N. Y., returned to their rooms at the Deke house at M. I. T. recently after a week-end at home, and were considerably taken aback to find two heavy railroad rails welded firmly into place diagonally across their quarters. The welded rails resisted all manual attempts at removal by the two young men, while a crowd of their fraternity brothers gathered to offer suggestions. An oxyacetylene torch might have caused considerable damage to the floor, a power hammer might have ruined the walls, dynamite might have unsettled the house, so the problem was a knotty one.

If the rails are still there, we suggest the boys just nail a new floor over them and forget about the whole thing.

* * *

No Santa

SEEMS as though every time we open our mouth we put our foot in it, to use an ancient wheeze. Last week, in an item about Whitey Maurath and his plastic puppet, we said he would appear as Santa Claus on the cover of the next issue of STEEL. Well, here is the issue and if you can find Santa Claus on the cover you have a good imagination. Checking back we find that Santa will appear, rain or shine, on the cover of the Dec. 28 issue. And not only will appear, but will be riding in an airplane made out of welding rod.

—SHRDLU

INQUISITIVE CAMERA DEPT.—XX

IF THE pages of STEEL *are pleasingly arranged and legibly printed, give credit, in part at least, to Mr. Bill Agardy who for some eight or nine years has been an important cog in the composing room of* STEEL'S *printing department.*

Strip

Strip Prices, Page 77

Pittsburgh—With some seven to eight weeks' backlogs, especially on narrow hot-rolled strip, and a similarly sold-out condition in cold-rolled and stainless strip steel, most strip sellers had, by the middle of last week, withdrawn all fourth-quarter prices. Such spot business that has developed since is taking the higher first-quarter market, but as expected, this spot business is inconsequential by comparison with advance buying. However, on new orders the market is quoted 2.15c, Pittsburgh, for hot strip and 2.85c for cold-rolled strip.

Cleveland—Auto partsmakers, small farm tool and electrical equipment manufacturers while not as active as two or three weeks ago, are placing some orders at the advanced figures. The question of price is of slight importance to those consumers who, having underestimated their requirements, are now in urgent need of material. In a few instances some of the larger customers have specified well in advance so as to have preferred position on mill rolling schedules when they contemplate again being in need of material.

Chicago—Strip mills are practically sold out for the remainder of this month and January and are quoting higher first quarter prices on new business. Operations are being pushed in an attempt to complete delivery of low-price tonnages by Jan. 31. Consumption has been expanding as a consequence of better automotive operations, though requirements of miscellaneous users are steady or heavier.

Philadelphia—With deliveries on both hot and cold-rolled narrow strip now several weeks off, there is a disposition among some buyers to get specifications on mill books, even though they now have to pay the higher prices. However, the volume of this business is small compared with the activity which took place before the price advances.

New York—Sellers of narrow strip have a breathing spell from new orders but find it difficult to keep up delivery schedules. Specifications during recent weeks are the heaviest in several years, particularly from makers of household electrical equipment and toys.

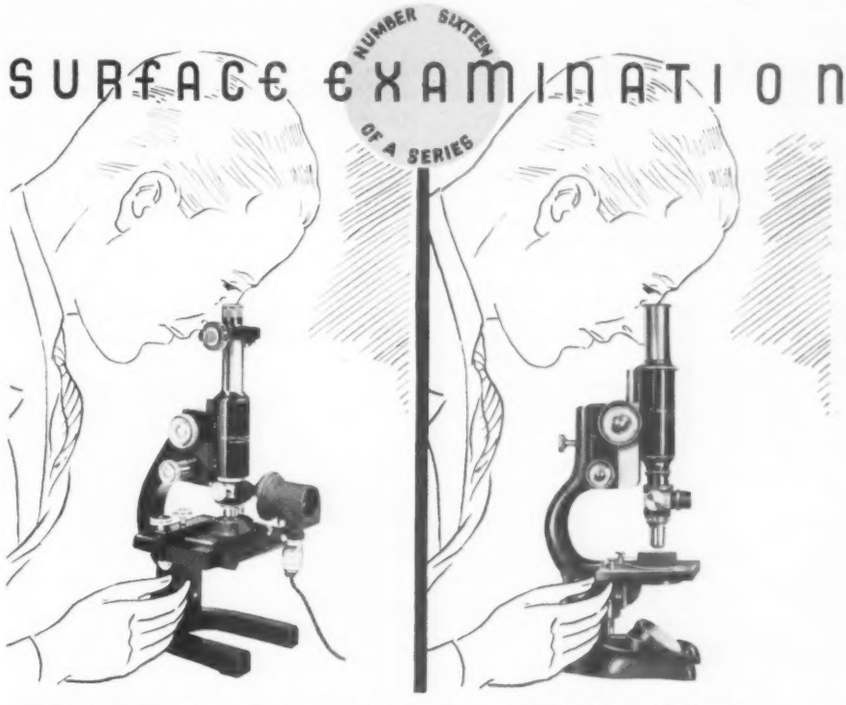
Youngstown, O.—Both hot and cold-rolled strip buyers are contenting themselves with such allotments as mills are able to distribute. Alleged huge tonnage bookings of automotive interests into second quarter of next year are denied here. It is pointed out that the largest Detroit builder of automobiles has not placed any of its usual tonnage for forward delivery.

Wire

Wire Prices, Page 77

Pittsburgh—Influx of heavy orders for both manufacturing and merchant wire products continues to keep wire mills far in arrears on delivery. One leading local wire producer, for example, has taken enough business to last until late February. Much of this activity is at the advanced prices of $2.25 on nails and 2.60c on plain wire, but it is true that large balances are still due consumers at fourth-quarter prices of $2.05 on nails and 2.50c on wire.

Cleveland—Producers report a continued high rate of activity from miscellaneous consumers. This strong demand has naturally extended deliveries unusually far. Because of this shipments during De-



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cember are expected to be slightly more than in November, which was previously reported as one of the best months this year. Prices are firm as customers seek to get material to satisfy their pressing needs.

Chicago—Production is slightly heavier as producers are attempting to relieve heavy order books. New business is relatively light as a result of previous coverage by many buyers. Consumption of manufacturers' wire shows gains in some directions, while activity in merchant products continues at a relatively lower rate than that of plain wire. Higher prices are being quoted on new business, representing advances of $2 to $4 over former fourth quarter levels.

Philadelphia—Indications point strongly to another early advance in wire products, with an announcement expected in some quarters before Jan. 1. The proposed changes may prove to be in the nature of a readjustment in some items, as it is pointed out that there are still a number of inconsistencies, even in the new schedules. For instance, it is pointed out, nails at 2.25c, Pittsburgh, are made of wire quotable at 2.75c, and barbed wire at 2.75c is made from galvanized wire with a base of 3.30c. With heavy demand still in prospect, it is regarded by some as inevitable that higher prices will be named on some descriptions.

Youngstown, O.—Wire and wire products requirements have been put forth briskly by consumers and the position of mills now is regarded as comfortable.

Shapes

Structural Shape Prices, Page 76

Pittsburgh—Inquiries lists a 1500-ton power plant extension at Brooklyn, N. Y., for the Williamsburg Powre Plant Corp., and 600 tons for an Owens-Illinois Glass Co. factory at Streator, Ill. Among contracts placed are 1200 tons for a Crown Cork & Seal Co. machine shop at Baltimore and 812 tons in a Chesapeake & Ohio railway bridge at Balcony Falls, Va. The market continues to be quoted 1.90c, f.o.b. Pittsburgh, with the application of the $3 advances scheduled for effect on structural shipments after Jan. 31, also on specific building jobs after that time.

Cleveland—Fabricators are swamped with inquiries for specified jobs on which awards will be made before Jan. 1. One large fabricator claims of the 30 jobs on which it has recently figured, all are due to be placed within the next two weeks. By far the majority of these projects are of small tonnage, ranging from 25 to 75 tons. However, the five-story building for Cleveland Twist Drill Co., Cleveland, and the Lorain county state bridge, are two large pending projects to be placed soon.

Chicago—Structural inquiries are numerous, approaching expiration of the price protection period driving in a large volume of small projects, as well as a sprinkling of larger items. Bridge work predominates the list, with 3500 tons involved in 11 structures in Indiana, Illinois and Missouri. More than 30,000 tons of shapes will be required for small miscellaneous projects on which bids are being taken. An increase in awards is in early prospect, though shipments of fabricated material are expected to change little during the next 60 days.

New York — The outstanding awards in many months totaling 47,700 tons of cast iron and steel tunnel linings for the second Midtown-Hudson tube for the Port of New York Authority, went to Bethlehem Steel Corp., Bethlehem, Pa. Building awards have been light, but considerable tonnage is moving toward the contract stage. Inquiries from private sources wishing to cover against the $3 mill advance effective Jan. 1, have been heavy.

Philadelphia—Substantial volume of work is expected to be figured between now and Jan. 1, when the $3 advance on shapes becomes effective. Pennsylvania railroad is rushing plans for its electrification program between Paoli, Pa., and Harrisburg, Pa., with the possibility that protections will be asked on blanket requirements with detailed specifications later. Bids will be opened Dec. 21 on the superstructure of the toll bridge between Easton, Pa., and Phillipsburg, N. J., involving, according to the engineer's estimate, approximately 4700 tons of shapes.

Shape Awards Compared

	Tons
Week ended Dec. 18	13,667
Week ended Dec. 11	26,985
Week ended Dec. 4	17,132
This week, 1935	25,584
Weekly average, 1935	17,081
Weekly average, 1936	21,649
Weekly average, November	19,043
Total to date, 1935	880,024
Total to date, 1936	1,104,111

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Bids were opened last week on 1600 tons, for a Maryland state bridge at Point of Rocks.

St. Louis—Absence of new awards particularly of public work projects, is reflected in a further slight recession of activities at fabricating plants. The rate is estimated at about 40 per cent of capacity. Purchasing of shapes by the fabricators has fallen off noticeably.

San Francisco—Action on the award of the Federal Building, Los Angeles, involving 12,000 tons of shapes and 6000 tons of reinforcing steel, will be postponed until further appropriations are made.

Seattle—Shop operations are tapering and no important projects are up. Much work is being delayed until the intercoastal lines resume services. Added to this situation is the normal tendency to postpone projects until after the end of the year.

Shape Contracts Placed

47,700 tons, cast iron and steel tunnel rings for second Hudson-Midtown tunnel, New York, to Bethlehem Steel Co., Bethlehem, Pa.

1200 tons, machine shop, for Crown Cork & Seal Co., Baltimore, to Bethlehem Steel Co., Bethlehem, Pa.

812 tons, bridge No. 1746A on new line, Balcony Falls, Va., for Chesapeake & Ohio railway, to American Bridge Co., Pittsburgh.

780 tons, pier shed, San Francisco, to Virginia Bridge Co., Roanoke, Va.

745 tons, building, Howard university, Washington, to Lehigh Structural Steel Co., Allentown, Pa.

705 tons, mill buildings, for Brunswick Pulp & Paper Co., Kingsport, Tenn., to Bethlehem Steel Co., Bethlehem, Pa.

650 tons, apartment, East Seventy-third street, New York, for Bing & Bing Inc., New York, to Bethlehem Fabricators Inc., Bethlehem, Pa.

600 tons, H. J. Heinz Co. plant, Medina, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, bridge, Sioux City, Iowa, to Haakinson & Beaty Co., Sioux City.

475 tons, mill building, for Youngstown Sheet & Tube at Youngstown, O., to Fort Pitt Bridge Works, Pittsburgh.

470 tons, grain building, Kreuger Brewing Co., Newark, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

440 tons, bridge PWS 199-C, Franklin county, Mississippi, to Nashville Bridge Co., Nashville, Tenn.

440 tons, new South Chase avenue subway state bridge, Milwaukee, to Fort Pitt Bridge Works, Pittsburgh.

430 tons, building, American Suppliers Inc., Richmond, Va., to Bethlehem Steel Co., Bethlehem, Pa.

430 tons, bridge over Savannah river, Allendale, S. C., to Bethlehem Steel Co., Bethlehem, Pa.

400 tons, building, for Bowen Products Co., Detroit, to R. C. Mahon Co., Detroit.

345 tons, annealing furnace, Youngstown Sheet & Tube Co., Youngstown, O., to Levinson Steel Co., Pittsburgh.

325 tons, warehouse building, Detroit, for Jones & Laughlin Steel Corp., Pittsburgh, to Jones & Laughlin Steel Corp.

290 tons, Otter creek bridge and overpass, Wallingford, Vt., to Bethlehem Steel Co., Bethlehem, Pa.

280 tons, two buildings, for Hilton-Davis Chemical Co., Norwood, O., to Ingalls Iron Works, Birmingham, Ala.

260 tons, repairs to bridge No. 5204, Terral, Okla., for Chicago, Rock Island & Pacific railway, to Bethlehem Steel Co., Bethlehem, Pa.

260 tons, Prospect school, Pittsburgh, to Keystone Engineering Co., Pittsburgh.

250 tons, field office building, Weehawken, N. J., for Port of New York authority, to Bethlehem Fabricators Inc., Bethlehem, Pa., through George Siegler Co. Inc., Jersey City, N. J.

250 tons, Mary Immaculate seminary, Northampton, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.

250 tons, plant addition, Atlas Powder Co., Wilmington, Del., to American Bridge Co., Pittsburgh.

240 tons, health center building, Kips Bay, New York, to Harris Structural Steel Co., New York, through Stock Construction Co., New York.

225 tons, extension to building No. 623-B, Alcoa, Tenn., for Aluminum Co. of America, to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, underpass, Project WPGH-851-A, Harris county, Texas, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, foundry building, for Motor Wheel Corp., Flint, Mich., to Flint Structural Steel Co., Flint, Mich.

200 tons, platform extensions, Chicago Rapid Transit Co., to Hansell-Elcock Co., Chicago.

160 tons, office and factory, Twin Coach Co., Kent, O., to Burger Iron Co., Akron, O.

140 tons, rock crushing plant, North Jersey Quarries Inc., Portland, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.

140 tons, bridge over Pennsylvania railroad, Blasdell, N. Y., to American Bridge Co., Pittsburgh.

135 tons, office building, Brewster, N. Y., to Belmont Iron Works, Philadelphia.

115 tons, Hershey creamery, Chambersburg, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

110 tons, bridge PWS 13-65, I-11, Madison-Yazoo, Mississippi, to Austin Bros. Bridge Co., Atlanta, Ga.

105 tons, gates for bureau of reclamation, Mesa, Ariz., to Consolidated Steel Corp., Los Angeles.

100 tons, including railings, Granger road bridge, Cleveland, to Fort Pitt Bridge Works, Pittsburgh, through Highway Construction Co., Cleveland.

Shape Contracts Pending

25,000 tons, Pennsylvania railroad electrification work, main line, west to Harrisburg, Pa.

5100 tons, including 2100 tons of piling, Mississippi river dam, New Boston, Ill.; bids Jan. 19 to United States engineers, Rock Island, Ill.

1830 tons, six county bridges, Delaware county, Indiana.

1800 tons, two bridges, Queens, N. Y.; Necaro Co. Inc., New York, low.

1600 tons, Maryland state highway bridge, Point of Rocks; bids opened Dec. 15.

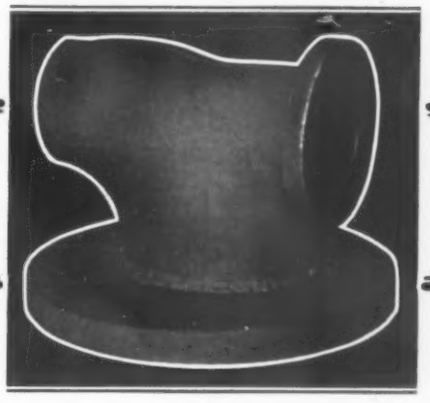
1500 tons, extension to power plant, for Williamsburg Power Plant Corp., Brooklyn, N. Y.

1275 tons, bridge, W-36-3, Queens, N. Y.;

1160 tons, field house and law building, University of Kentucky, Lexington, Ky.

1110 tons, two state bridges, Illinois.

1100 tons, Little Falls, N. Y.; Metzger Corp., Buffalo, low.



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Tully & DiNapoli Inc., New York, low.
1000 tons, Transit road grade elimination, Depew, N. Y.; Foley Bros. Inc., New York, low.

880 tons, three state bridges, Missouri.
875 tons, viaduct, Project WPGM-611, Minot, N. Dak.

750 tons, state bridge, Lorain county, O.; John Hill, Ada, O., general contractor.

700 tons, bottling plant, Louisville, Ky.
600 tons, field house, Jefferson, Ind.
600 tons, factory and warehouse, for Owens-Illinois Glass Co., Streator, Ill.
588 tons, bridge over Sacco river, Buxton-Hollis, Me.; Boston Bridge Works Inc., Boston, low.
574 tons, bridge over Sacco river, West Buxton-Hollis, Me.; Harris Structural Steel Co., New York, low.
540 tons, grade crossing elimination work, Pennsylvania railroad, Colonia, N. J.; bids Dec. 18.
500 tons, tunnel ribs, Water & Power dept., Los Angeles; Commercial Shearing & Stamping Co., Youngstown, O., low.
500 tons, coast guard hangar and buildings, Rockaway, N. Y., for treasury department, Washington; bid date extended to Dec. 29.
500 tons, 5-story building, Cleveland Twist Drill Co., Cleveland; bids Dec. 21.
500 tons, post office, Peoria, Ill.
475 tons, bridge, Colorado Springs, Colo.
400 tons, Feather River bridge, Nicolaus, Calif.; bids soon.
400 tons, addition, Washburn Wire Co., New York; out for figuring.
400 tons, sand beams and rod house, for General Steel Castings Corp., Eddystone, Pa.
400 tons, asphalt plant, New York; Woodcrest Construction Co. Inc., New York, low.
390 tons, includes 55 tons reinforcing, state bridge, Tillamook county, Oregon; bids in.
360 tons, bridge, Dunwoodie, N. Y., for New York Central railroad; bids Dec. 22.
322 tons, including 47 tons of piling, Parker bridge, Yuma county, Arizona; Pittsburgh-Des Moines Steel Co., Pittsburgh, low.
350 tons, bridge, Springfield, Mass.
300 tons, Horticultural building, Syracuse, N. Y.; bids Dec. 19.
300 tons, Tennessee Valley Authority, Knoxville, Tenn.; bids Dec. 30.
300 tons, supports for turbine No. 6, for Union Electric Light & Power Co., Monsanto, Ill.
286 tons, Lilly Deche office building, for Realty Corp. of New York; out for figuring.
269 tons, bridge over Nashua river, Pepperell, Mass.
260 tons, grade separation bridge, Villa Park, Ill.
220 tons, bridge over Clear creek, Denver.
210 tons, building addition and tower, for Lever Bros., Hammond, Ind.
210 tons, factory building, for Burroughs Adding Machine Co., Plymouth, Mich.
205 tons, 40 steel frames for fishway, Bonneville dam, Oreg.; bids Dec. 22.
200 tons, taxpayer building, New York; bids in.
200 tons, stock house, Piel Bros., Brooklyn; out for figuring.
200 tons, garage and distributing building, Western Electric Co., Cincinnati; bids Dec. 21.
150 tons, bridge, Wilmot, Kenosha county, Wisconsin; E. J. Groves & Sons Co., Minneapolis, low bidder.
121 tons, four bridges in Crook and Sheridan county, Wyoming; bids opened.
110 tons, for highway bridge Okmulgee county, Oklahoma; bids Dec. 15.
107 tons, bridge WPSO-R-222, Jamaica, Vt.; O. A. Priest, Belmont, Vt., low.
100 tons, piling, Treasury department, Los Angeles; bids opened.
100 tons, building, Greenpoint Savings bank, Brooklyn, N. Y.; J. K. Turton Co. Inc., New York, general contractor.
100 tons, high school, Stevens Point, Wis.

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Reinforcing

Reinforcing Bar Prices, Page 77

Pittsburgh—The market on new billet steel bars will be advanced for the first quarter by $3 a ton, to 1.90c as the jobbers' base for stock lengths and 2.25c as quoted by distributors for carload lots of cut lengths. Thus widening the jobbers' allowance by $1 a ton to $5. Bids on specific and identified building projects will be protected at the old price if closing dates are set before Dec. 23. Shipments on projects before Dec. 23 will continue for the life of the job, but no later than June 30, 1937. The higher price for stock contracts will be in effect Jan. 31 and thereafter providing specifications are entered before Dec. 23. Rail steel bar producers have followed the same course and will quote 2.10c for cut lengths, as of the same effective dates. Also for effect with the first quarter, bending extras will be advanced to $8 and $18 for light and heavy respectively, from the present $6 and $16 extras.

Cleveland—Small jobs continue to dominate the market here. The largest tonnage pending consists of 80 tons to be used in conjunction with 500 tons of structural steel for the Cleveland Twist Drill Co., Cleveland. Mills are reported active with little change in operations so far this month. Road repair work has declined considerably and aside from few small grade crossings little tonnage is offering. A $3 per ton advance on jobbers base price will go into effect Dec. 23.

Philadelphia—With a $3 advance scheduled for Dec. 23, reinforcing bar consumers show livelier interest, although pending tonnage is still far from heavy. Possibly the largest inquiry is from Campbell Soup Co., Camden, N. J., involving 1200 tons. Fairly sizable tonnages will likely be required for two elementary schools in Philadelphia, on which bids are to be opened Jan. 6, and on which contractors will undoubtedly seek protection before the price advances is made. Several

Concrete Awards Compared

	Tons
Week ended Dec. 18	2,810
Week ended Dec. 11	2,141
Week ended Dec. 4	2,495
This week, 1935	19,803
Weekly average, 1935	6,862
Weekly average, 1936	5,989
Weekly average, November	3,757
Total to date, 1935	359,743
Total to date, 1936	305,442

miscellaneous road jobs, principally Pennsylvania state projects, have been placed.

New York—The paradoxical situation of a $3 mill advance effective Dec. 23, on deliveries for the remainder of the month and for first quarter, and price shading from $4 to $6 in sporadic instances existed in the market here last week. In most quarters prices appear to be stiffening. One major producer will quote 2.60c, f.o.b. cars New York. An appreciable advance has been made in bending extras. Lettings have been light, but projects nearing the closing stage are more numerous.

Chicago—Producers will advance billet and rail steel reinforcing bars $3 a ton, effective Dec. 23. Quotations recently have been weak and there is little indication whether the market can be stabilized at the higher levels of 2.25c for billet bars and 2.10c for rail steel material. Shipments continue heavy and inquiries are active. While many new inquiries involve only small lots, several large tonnages are pending.

San Francisco—Awards of reinforcing steel bars were the smallest in over three months and aggregated only 695 tons, bringing the total for the year to 227,207 tons as compared with 220,356 tons for the corresponding period in 1935.

Seattle—New orders continue to be placed in anticipation of expected price increases which have not yet been announced. Business is in small lots but the total aggregates considerable tonnage. No large projects are up for figures. Both local mills are operating to capacity with sizable backlogs. Mill price of reinforcing remain at 2.45c but a higher level is expected to be announced before the end of the month.

Reinforcing Steel Awards

575 tons, highway bridge, Benton county, Missouri, Vincennes Bridge Co., Vincennes, Ind.

400 tons, viaduct in St. Louis, Sheffield Steel Corp., Kansas City.

250 tons, sixth avenue subway, to Concrete Steel Co., New York.

227 tons, Boise, Ida., reclamation project, to unnamed interests.

197 tons, bureau of reclamation, invitation A-42, 150-A, Potholes, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

190 tons, state bridge, route 33, Mifflin county, Pennsylvania, through H. W. Shaull Co., Mechanicsburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

160 tons, state institution buildings, Illinois, to Calumet Steel Co., Chicago.

135 tons, state road work, route 11, Wyoming county, Pennsylvania, through F. V. Ressler, Northumberland, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

135 tons, viaduct, Sacramento, Calif., to Palm Iron Works, Sacramento, Calif.

125 tons, reservoir, Ware, Mass., to Bethlehem Steel Co., Bethlehem, Pa., through Benj. J. Foster Co., Philadelphia.

125 tons, road work, state of Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

116 tons, bureau of reclamation, invitation A-42, 151-A, Knob, Calif., to Colorado Fuel & Iron Co., Pueblo, Colo.

100 tons, bureau of roads bridge, Bonner county, Idaho, to unnamed interests.

100 tons, junior college, Palo Alto, Calif., to Colorado Fuel & Iron Co., Pueblo, Colo.

100 tons, state bridge, route 184-4, Luzerne county, Pennsylvania, through the Correale Contracting Co., Hazleton, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

Reinforcing Steel Pending

665 tons, fish freezing and storage plant, Boston.

600 tons, bridge, for city of Manchester, N. H.; bids Dec. 23.

600 tons, Mississippi river dam, New Boston, Ill.; bids Jan. 19 to United States engineers, Rock Island, Ill.

325 tons, bridge WF-36-3, Queens, N. Y.; Tully & Di Napoli Inc., New York, low.

305 tons, specification 2157, Los Angeles; bids opened.

275 tons, grade crossing elimination, Thirty-fourth street and Eleventh avenue, New York, for New York Central railroad; bids Dec. 22.

250 tons, state grade crossing eliminations, Illinois.

200 tons, sewage project for city of Cleveland.

200 tons, asphalt plant for New York City; Woodcrest Construction Co. Inc., New York, low.

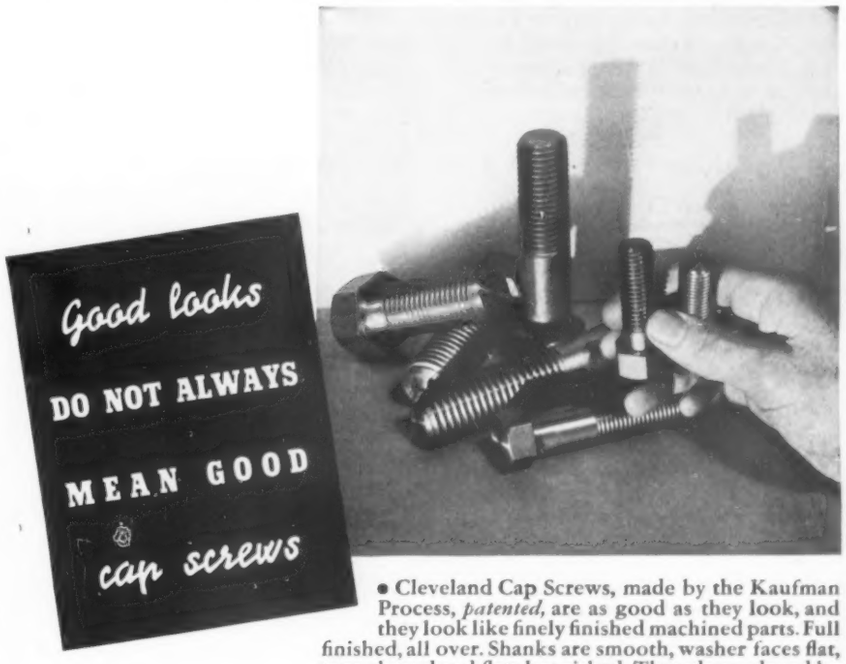
100 tons, field office building, Weehawken, N. J., for Port of New York authority; George Siegler Co. Inc., Jersey City, N. J., general contractor.

Pig Iron

Pig Iron Prices, Page 78

Pittsburgh—Necessary shutdown of several of the blast furnaces in this district, which have been long overdue on relining and other repairs, is a strong factor for a pronounced scarcity of pig iron in the near future. Twenty-two steelworks blast furnaces are now in blast, and five or six of that number are in need of relining. So strong has been the demand for basic iron for the open hearth that several steelworks interests have definitely withdrawn from the merchant market.

Cleveland—Producers report considerable tonnage already contracted for first quarter. Auto, machine tool and farm equipment foundries have shown improvement in activity. Shipments so far this month are heavier than in the corresponding period during November. Recent reversal in the trend of scrap prices



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has strengthened the position of pig iron. Requirements of foundries in the railroad field have been stimulated somewhat by recent buying by the carriers.

Chicago—Only occasional small spot orders are being received, but heavy shipments continue against old contracts. December will set a new peak for the year in deliveries and will be substantially ahead of the corresponding period of the past several years. Consumption is moderately heavier, due principally to increased requirements of the automotive and farm implement industries.

Buffalo—Many consumers have covered first quarter requirements of iron, following the report that prices may be due for another advance. Shipments are being speeded up to overcome the loss of iron which is tied up in the state barge canal for the winter due to a freeze in of a score of the fleets carrying the tonnage. All 12 furnaces are active and will run through the holidays and into the coming year in order to supply the urgent demand which now confronts producers for both steelmaking and merchant grades.

Philadelphia—Some pick-up in new demand is noted for pig iron, as indications point more definitely to still higher prices. Some district representatives have to refer all new orders to their home offices before acceptance can be definitely made.

A Swedeland, Pa., producer will blow in a larger furnace this week to supplant a smaller one.

New York—The largest export order for pig iron in years, 40,000 tons for Japan, is reliably reported here. Japan, as noted in a recent issue, came into the market here for 50,000 tons, including both basic and foundry grades, and it is definitely known that Japan has placed orders for some of this iron in this country, although details as to the entire 40,000 tons reported as placed have not been revealed. Domestic demand is featured by an inquiry for 10,000 tons of gray forge iron for an upstate puddler, some of which has been placed with eastern Pennsylvania furnaces.

Cincinnati—Shipments of pig iron are steady, close to recent months, as furnace interests defer announcement of policies affecting the large tonnage bought prior to the price advance and not yet taken out.

St. Louis—Principal activity on the part of pig iron sellers is to get forward tonnages to customers included in low figure contracts. Movement is heavy, and there is every indication that total December shipments will exceed any month this year, and represent the largest December aggregate since 1929. Specifications from all classes of melters are on an extensive scale, and despite heavy current consumption, reserve stocks have increased substantially since mid-November.

Birmingham, Ala.—While shipments have tapered off slightly the past week, the pig iron market has lost none of its strength. Fifteen blast furnaces are active and surplus stock is comparatively light. Melters intimate that this temporary lull in purchasing will not affect the market.

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Scrap

Scrap Prices, Page 79

Pittsburgh—For the third successive week, scrap prices moved upward in probably the sharpest peacetime jump in history, and with No. 1 steel now quoted $18.75 to $19.25 for Pittsburgh district delivery, the market is up $2 a ton in little more than two weeks. Important purchases have been made by consumers at $19, delivered, but brokers by the middle of last week were withdrawing from selling at $19.50 and a few who did venture offers asked $20 a ton. A $1 ton advance in machine shop turnings makes that market now $13.50 to $14, and railroad specialties are up similarly to a range of $23 to $23.50. A leading mill here has sold another lot of its scrap which has been accumulating over the past five to six years and has now completely cleared its inventory. The last lot is being moved via all water to a plant of a competitor at $19, delivered.

Cleveland—Quick rise in demand for iron and steel scrap has brought an advance of $1.50 to $2 in all grades. But even higher prices are bringing out only comparatively limited tonnages and supplies from outside points continue restricted. While three vessels loaded with scrap from upper lake ports have landed at Cleveland, still it is expected that important buyers will re-enter this market for additional supplies here and in the Youngstown district by the end of this month.

Chicago—Scrap prices have risen sharply, with most quotations at the highest level in more than 11 years. Heavy melting steel is quiet in the consumers' market, but is up 75 cents on the basis of dealer and broker transactions. Buying of other grades is fairly brisk, and with supplies somewhat restricted in certain instances, quotations have advanced as much as $2 a ton.

Detroit—Advances of 50 cents to $1 a ton have forced the local scrap market again toward the high levels of early fall, with a revised No. 1 steel market now quoted $14 to $14.50, hydraulic compressed sheet scrap at $14.25 to $14.75, machine shop turnings at $9 to $9.50, and cast iron borings at $9.50 to $10. Heavy call for remelting material from consuming points outside of Detroit, as well as a strong local demand, have been the chief factors in last week's advance.

Boston—Heavier demand was instrumental in bringing broker's buying prices up sharply, with advances of 25 cents to $1.50. Steel car axles for domestic consumption are quoted at $16 to $16.25, up $1.50. Borings

and turnings and cast grades are featured in the strong price tone. With Italy and Poland, Great Britain and Japan taking large tonnages out of New England, brokers' prices f.o.b. Boston docks have been increased 25 cents on both No. 1 and No. 2 steel. Buying prices for delivery at New England points are unchanged.

A proposal to add $5 per car to the established rate on iron and steel scrap delivered to the Boston & Albany or New York, New Haven & Hartford at Boston, in order to place "Boston & Maine docks on a more comparable basis with other docks at Boston," is before the New England Freight association, South Station, Boston.

New York—Prices advanced so rapidly last week on the basis of heavy demand from all mills that quotations rose from day to day. Cast grades were prominent in this upward swing. Most of the shipments are on new orders, although it is reported that some is against old commitments. The shipping strike is causing freight rates to advance and making foreign shipments less heavy and frequent than previously.

Buffalo—There is a good inquiry for scrap specialties, especially cast and short steel rails. Dealers see their position improving in heavy melting steel as consumers make deep inroads into stocks believed none too large. Dealer stocks are accumulating slowly due to unusually severe weather.

Philadelphia—Scrap prices have again advanced throughout practically the entire list. No. 1 steel has been advanced to a range of $15.50 to $16 and No. 2 steel $14 to $14.50, delivered consuming point, although these increases are due largely to higher buying prices by dealers in covering on contracts, rather than to new consuming purchases.

In some quarters it is now regarded doubtful if $16 could be done by nearby consumers on a sizable tonnage of No. 1 steel, and it is predicted that the market on No. 1 steel in this district will probably advance to as high as $18 before the current movement is over.

Cincinnati—Dealer activity and advances in other districts have again sent scrap prices upward 25 to 75 cents a ton, with principal effect on the heavier grades. Brokers are fairly well covered on heavy mill commitments entered earlier this month. Foundries are steady buyers.

St. Louis—Further tightening in the iron and steel scrap situation has resulted in further general advances in dealer prices of 25 cents to as high as $1.50 per ton. In the case of heavy melting steel and some other important grades, quotations are the highest since 1929.

While steel grades, of which there is an acute shortage and a large short interest, are most directly affected, there were also stiff advances in cast, malleable and other grades.

Birmingham, Ala.—With limited tonnage still available and quotations holding firm, iron and steel scrap is considered strong. Heavy melting steel is being held at $12.50 to $13.50 with a fairly good tonnage moving.

Warehouse

Warehouse Prices, Page 80

New York—The seasonal trend is becoming noticeable in warehouse sales although current business seems to be considerably better than in recent years. Strip sales are being made at 3.56c, which covers only $4 of the mill advance of $5, although not all sellers have increased from 3.36c. This price is expected to hold for the remainder of December and into first quarter.

Pittsburgh—Steel warehouse interests here state they are not likely to announce price advances before Jan. 1. Bars, plates and shapes are expected to go up $3 a ton, sheets, $4 a ton, and other products in strict conformity with the advances in mill prices at that time. Demand is running at a fairly high rate, but not up to the volume of the first 15 days of November.

Philadelphia—Prices on No. 24 hot-rolled annealed and on No. 24 galvanized sheets out of warehouse were advanced here last week $6 a ton. Advances on a number of other major products are expected to be announced momentarily, with Jan. 1 the effective date. Demand so far this month has been well above normal.

Cleveland—Warehouse distributors report a slight decline in average daily sales, mainly due to the inventory period and seasonal falling off in demand. In spite of the approaching holidays total sales this month are expected to fall only a little below November. A general advance in prices is expected the latter part of this month, to conform with recent adjustments announced in mill products. Some expected the advance to come last week for higher prices are now quoted on some mill products, due to their extensive backlogs.

Detroit—Jobbers will announce new schedule of higher prices about Jan. 1. Current sales are at a high level, considering the season.

Cincinnati—Warehouse sales so far this month have been ahead of the corresponding period last month. Sheet demand is undiminished. Higher prices will likely go into effect Jan. 1, so far being unannounced.

Chicago—Sales are off slightly, but the decrease is less than seasonal and December will make the best comparison with November for many years. Price advances on commoner products are looked for Jan. 1.

St. Louis—Volume of sales of steel from warehouse continues at the

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high level of recent months. With the exception of standard structural shapes, the usual seasonal recession in demand has failed to appear. Many users are stocking up against the higher prices which will become effective at the turn of the year.

Seattle—Strike conditions, reverberations of the tieup of shipping, have affected the jobbing trade adversely. Volume is less than last month, and no improvement is expected for 30 days.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 77

Bolt, nut and rivet shipments are heavier as a result of recent buying in anticipation of higher prices. Consumption is gaining in some directions, notably the automotive and farm implement industries, while heavier demand is in early prospect from railroad equipment builders. First quarter contracting is under way, but the higher prices which became effective recently on bolts and nuts have yet to be tested.

Metallurgical Coke

Coke Prices, Page 77

The market on standard furnace beehive coke has been advanced to a minimum of $3.90, f.o.b. Connellsville, Pa., ovens, an advance of 15 cents a ton. Some small spot sales are ranging up to $4.10 and $4.15, making the market quotable at $3.90 to $4.15. Common foundry coke, also beehive quality, has been advanced 25 cents a ton to a range of $4.50 to $4.75, f.o.b. ovens. No new contracts have been reported as most beehive coke sellers are admittedly out of the market and are having a difficult enough time making shipments. By Jan. 15 it is expected that fully 3500 beehive coke ovens in the western Pennsylvania district centering around Connellsville, Pa., will be in operation. At present 3040 are operating, compared with about 410 a year ago at this time.

By-product coke producers are experiencing difficulty in meeting deliveries in some cases, with shipments at the highest level of the year.

Ferroalloys

Ferroalloy Prices, Page 78

New York—Shipments of ferromanganese this month will establish a new record for the year with heavy orders early in the month before the $5 advance. Domestic spiegeleisen is also unusually active. Demand is so heavy abroad that some leading steel importers have recently withdrawn from the market pending announcement of higher prices. Indications point to a world shortage of steel within a few months, some leading importers believe. Japan, which has been a recent buyer of pig iron here is reliably reported to have recently sold a large tonnage of rails to Brazil in exchange for cotton and other commodities. Some leading ore importers believe they will have little ore for sale here for some time as their mines are well sold for all 1937.

Iron Ore

Iron Ore Prices, Page 79

Cleveland—Receipts of iron ore at Lake Erie ports for the season, shipments to interior furnaces, and dock balances follow:

Port	Receipts	Shipments	Dock Bal. Dec. 1, 1936
Buffalo	3,704,067	29,105	2,212
Erie	1,536,884	1,546,449	54,939
Conneaut	6,772,428	6,526,574	1,858,267
Ashtabula	4,471,698	4,464,362	1,695,947
Fairport	898,389	887,979	403,818
Cleveland	9,033,387	7,150,016	581,621
Lorain	2,677,401	1,280,378	15,832
Huron	704,976	776,314	264,775
Toledo	1,512,952	820,809	40,937
Total	31,312,182	23,481,986	4,918,348
Year ago	19,889,804	14,012,447	5,313,265

Receipts at other than Lake Erie ports for November and current season follow:

Port	Receipts in Nov.	Current Season
Detroit	149,234	1,464,254
Indiana Harbor	240,113	2,167,432
Gary	357,378	3,241,428
So. Chi. (Loc. Furs.)	617,419	5,368,718
Sault Ste. Marie, Ont.	.....	117,001
Hamilton, Ont.	65,988	465,654
Total	1,430,132	12,824,487
One year ago	557,409	8,154,055

Steel in Europe

Foreign Steel Prices, Page 80

London—(*By Cable*)—Some pig iron tonnage has been contracted for second quarter delivery in Great Britain. Trading in hematite pig iron is restricted, owing to an expected increase in price. Growing semifinished steel output is proving insufficient to meet needs of finishing mills and the import quota has been largely extended as steel trade prospects are expanding.

Production of steel remains at a high rate, totaling 1,001,300 tons for November, compared with 1,060,500 tons in October. However, the daily rate in November was 40,052 tons, compared with 39,277 tons in October. In pig iron November production totaled 643,100, a daily average of 21,437 tons, compared with a total of 670,300 tons in October, a daily rate of 21,622 tons. Stacks in blast at the end of November were 114, compared with 113 in October.

Steel exports in November were 193,311 tons, compared with 194,360 tons in October, a decline of 1049 tons, probably due to the shorter month. Imports declined from 101,032 tons in October to 90,660 tons in November, a loss of 10,372 tons.

From the Continent comes report of active export trade and hardening of prices.

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Scrap Firm Expands; Officials Move Up

HIRAM WINTERNITZ JR., for a number of years in charge of the company's eastern operations, Philadelphia, has been elected president of the Charles Dreifus Co., iron and steel scrap, to succeed Charles Dreifus, founder, who will retire to become chairman of the board.

Walter S. Gates, of the Philadelphia office, has been made a vice president, and Charles Dreifus Jr., who has been in charge of the New York office for the past two years, treasurer, succeeding Harry C. Krider, Pittsburgh. Mark D. Kuhn will continue as a vice president and John W. Todd as secretary. The latter two will remain in Pittsburgh, in charge of company operations there.

The company will move its headquarters from Pittsburgh to Philadelphia Jan. 1, to better co-ordinate the direction of domestic inland operations with those of export and coastwise branches of its business.

The company also operates offices in Worcester, Mass., and Boston and has concentration yards in Brooklyn, N. Y., and Newark, N. J. It also has representatives in the South and at various Gulf ports, and has agents in principal European countries.

Mr. Winternitz first became associated in 1909 in the finished steel and scrap business founded by his grandfather in Baltimore, and later conducted by his father as Charles Winternitz & Sons. Subsequently, he became affiliated with H. P. Pearl & Co., Philadelphia, scrap dealers, and in 1921 became Philadelphia manager of the Dreifus company. He was born in Baltimore, attended John Hopkins university, that city, and later studied law at the University of Maryland.

Nonferrous Metals

Nonferrous Metal Prices, Page 78

New York — Active consumer demand for the limited supplies of copper, lead and zinc forced prices sharply higher last week to the highest levels recorded since 1930. The undertone of these markets closed strong.

Copper — Electrolytic advanced ½-cent on Monday to 11.00c, Connecticut, a new high since Dec. 8, 1930. Rolled products, brass ingot, copper and brass scrap, and copper wire and cable, advanced proportionately. Brass ingot base prices advanced ½-cent further with the exception of No. 1 yellow ingot which rose ¼-cent on Friday. Export copper continued to soar, closing around 11.25c, c.i.f. Future price trend here will depend largely on developments in the foreign market. Several small producers withdrew from the domestic market on Friday.

Lead — Prices advanced $4 per ton to 5.35c, East St. Louis, and 5.50c, New York, with St. Joseph Lead Co. still asking $1 premium in the East. The two advances of $2 per ton each were due to heavy demand, limited supplies and higher prices in London.

Equipment

Chicago—Machinery and equipment inquiries remain active, and while December sales of some types are expected to show a slight decrease from the November totals, this trend is seasonal and is thought likely to be reversed after Jan. 1. Deliveries on machine tools are no better and this is a major factor in prompting the early closing on pending purchases. By Jan. 1 prices of most types of machine tools will have been advanced, generally 10 to 15 per cent. Small lathes are being raised 15 per cent, with large lathes up to 10 per cent. Few price changes are being made in small tools, though this is regarded as a future probability. Machine tool inquiries from railroads continue fairly active, but placing of orders is being deferred until next year.

Pittsburgh — United Engineering & Foundry Co. has received an order for a 44-inch blooming mill from Republic Steel Corp., Cleveland, to be built in conjunction with the hot and cold continuous sheet-strip mill which Republic ordered from United Engineering recently. The blooming mill, to be installed at the Cleveland division of Republic with the continuous mills, will be a duplicate of the blooming mill United built for Ford, and a duplicate of the one United is now constructing for Richard Thomas Ltd., for installation in England. An important change in the specifications for the hot and cold sheet-strip mills has also been made by Republic. Both the hot and cold mills have been revised to be 98-inch mills, making them the widest continuous mills in the world. They will roll continuous strip up to 92 inches wide.

New York—Machine tool sales are being maintained at a steady rate as indications point to a 10 per cent price advance around the first of the year. In one instance, a 10 per cent advance already has become effective. Manufacturers of railroad equipment have been in the market for a number of tools. However, orders for one or two tools at a time seems to be the general rule. Delivery time is still well forward with little indication that the time can be reduced soon. Although sellers are uncertain as to the actual effect of the new tax law on bookings, apparently the act involving a tax on machinery financed out of current earnings has not become a factor in retarding sales to any appreciable extent.

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Construction and Enterprise

Ohio

BETHEL, O.—Village plans improvements to increase capacity of municipal light plant. Wm. F. Myers is mayor.

CANTON, O.—Berger Mfg. Co., 1038 Belden road N. E., subsidiary of Republic Steel Corp., has purchased plant of H. H. Miller Industries Co., east of here, and plans reconditioning and installation of machinery for manufacture of metal building equipment.

CLEVELAND — Foundry of Cleveland Production Co., 2112 West 106th street, was damaged by fire.

CLEVELAND—Cleveland Twist Drill Co., 1249 East Forty-ninth street, is receiving bids until Dec. 22 for five-story plant and office building to cost approximately $500,000.

CLEVELAND — Martin Bros. Electric Co., 1858 East Fortieth street, has acquired lot on Perkins avenue and East Thirty-sixth place and plans erection of new plant building, two stories, 25,000 square feet floor space. W. L. Martin is president.

COLUMBUS, O.—Lambert Art Metal Co., Yale and McKinley avenues, signed long-term lease on factory site at West Goodale street and Michigan avenue, formerly occupied by Universal Milking Machine Co., and plans extensive alterations and improvements. The company manufactures and markets architectural sheet metal products, fireproof doors, air-conditioning equipment, etc. R. E. Lambert is president.

DAYTON, O. — Air corps, materiel division, Wright field, office of contracting officer, will open bids Dec. 23 for furnishing 900 feet of flexible steel tubing, circular 37-404, for delivery various air depots; Jan. 5 for miscellaneous quantities of bar and rod steel, circular 37-396, for delivery Fairfield air depot, Osborn, O.; on Jan. 7 for miscellaneous quantities of aluminum and steel aircraft bolts and nuts, circular 37-379, at contractor's plant.

DEFIANCE, O.—Northwestern Electric Co-operative Inc. has $285,000 grant for construction of 289 miles rural transmission lines. Arthur Sherman, Hicksville, O., is president. Carl Frye, Farm Bureau, 620 East Broad street, Columbus, is engineer. (Noted Nov. 2)

DELAWARE, O. — Delaware County Rural Electric Co-operative Inc. will be ready for invitational bids about Jan. 5 for erection of 244 miles rural transmission lines. Carl Frye, care Farm Bureau Rural Electrification Co-operative Inc., 620 East Broad street, Columbus, is engineer. (Noted Nov. 2)

DOVER, O.—Reeves Mfg. Co. plans erection of building and installation of hot mill equipment for sheet steel. Cost is estimated at $550,000. A. J. Krantz is secretary-treasurer.

FINDLAY, O. — City has authorized service director, Sherman Frost, to secure additional engineering service in connection with proposed sewage disposal plant improvement estimated to cost $125,000.

FINDLAY, O.—North Central Rural Electric Co-operative Inc. is seeking federal approval for construction of 850 miles power lines in Hancock, Seneca, Wyandotte and Crawford counties. L. B. Keller, Tiffin, O., is president.

GALLIPOLIS, O. — City plans construction of sewage disposal system and incinerator. Cost is estimated at $400,000; PWA assistance will be applied for. John Gwinn is city manager.

HAMILTON, O.—Butler County Rural Electric Co-operative Inc., care Ohio Farm Bureau Rural Electric Co-operative Inc., 620 East Broad street, Columbus, is taking invitational bids, due Dec. 28, for construction of 184 miles rural electric lines. Carl Frye, 620 East Broad street, Columbus, is engineer.

LIBERTY CENTER, O.—Board of public affairs, is taking bids, due Dec. 28, for construction of waterworks and distribution system, including well, turbine pump, 100,000-gallon elevated steel tank and distribution mains. Cost is estimated at $55,851. Champe, Finkbeiner & Associates, 1025 Nicholas building, Toledo, are consulting engineers. (Noted Nov. 9)

NILES, O.—City is taking bids, due Dec. 29 for construction of $200,000 electric substation and distribution system improvements. A. H. Heidenrich, Hudson, is consulting engineer. (Noted Dec. 14)

OHIO CITY, O.—Village is preparing plans for consfruction of three-unit municipal light plant to cost $44,900. Carl Simon, Van Wert, is consulting engineer. (Noted Nov. 9)

URBANA, O.—United Paperboard Co. will construct $20,000 addition to its plant here. Max Zimmerman is manufacturing manager.

WILLOUGHBY, O.—Wolwin Chair Co. plant here was seriously damaged by fire Dec. 10. Samuel M. Winograd, 2489 Overlook road, Cleveland Heights, is president.

Michigan

ADRIAN, MICH.—Stearns Mfg. Co. Inc. has been formed by Eugene F. Olsen, 19 Maumee court, to deal in manufactured products.

ALPENA, MICH. — McGuire Development Co., 100 South Second avenue, has been incorporated by C. V. McGuire, 592 Cadieux road, Grosse Pointe, to engage in general manufacturing.

BAY CITY, MICH. — Aetna Portland Cement Co. is having plans drawn by Sigmund Firestone, architect and engineer, Rochester, N. Y., for installation of coal-burning equipment, including steel bunkers and conveyors, to be located in plant here.

DETROIT—Kelvinator Corp. is having $15,000 warehouse building erected by O. W. Burke Co., here.

DETROIT — Nickaloy Corp., 1019 Lafayette building, has been formed by Watson Beebe to deal in iron and steel.

DETROIT — O. & S. Bearing Co. is erecting machine shop on South Livernois avenue. Austin Co., Detroit, is contractor.

DETROIT — Timken-Detroit Axle Co. has awarded contract for construction of factory addition to Barton-Malow Co., 1900 East Jefferson avenue.

DETROIT — Advance Tool & Die Co. has been incorporated by Gordon J. Burkett, 19314 Andover avenue, to engage in manufacture of tools and dies.

DETROIT — Harley & Ellington Inc., 1507 Stroh building, architect is taking preliminary figures for construction of addition to warehouse of Loose-Wiles Biscuit Co. on Oakman boulevard.

DETROIT — Chrysler Corp. has awarded contract for construction of Oilite building on Harper avenue to J. A. Utley Co., 6031 Mansur street. Albert Kahn Inc., New Center building, is architect.

DETROIT — City department of public works is taking figures on construction of four incinerator plants of 450-ton, 350-ton, 250-ton and 350-ton capacity, respectively, for erection in various parts of the city. Bids are due Jan. 15, 1937.

GRASS LAKE, MICH.—Village has plans nearing completion for construction of waterworks system. Ayres, Lewis, Norris & May, Ann Arbor, are engineers.

JACKSON, MICH.—Goodyear Tire & Rubber Co., Akron, O., plans construction of $3,500,000 plant on site here, recently purchased from Kelsey-Hayes Wheel Corp. Clifton Slosser is vice president in charge of production.

KALAMAZOO, MICH. — Preliminary plans are nearing completion for construction of waterworks system estimated to cost $170,000. L. A. Cobb is engineer.

LANSING, MICH. — City expects to have work under way by Jan. 11 on its proposed sewage and garbage disposal plant.

LANSING, MICH. — Board of water and light commissioners is considering expenditure of approximately $2,000,000 for construction of additions and improvements to municipal power plant. Claude Erickson is engineer in charge.

MUSKEGON, MICH.—National Motor Castings Co., P. O. Box 185, Muskegon Heights, has been incorporated by Donald J. Campbell, to deal in metal forgings.

PECK, MICH.—Plans for construction of village waterworks system, to cost $25,000, are being completed by Francis Engineering Co., Saginaw, Mich.

WAKEFIELD, MICH. — City is considering proposal by Fairbanks-Morse Co., Chicago, for construction of municipal electric generating system at a cost of $106,200.

YALE, MICH. — City is having preliminary plans prepared for construction of sewage disposal plant and system, by Francis Engineering Co., Saginaw.

Connecticut

HARTFORD, CONN.—Arrow-Hart & Hegeman Electric Co., 103 Hawthorne street, manufacturer of electrical products, is receiving bids on general contract for five-story plant addition to cost over $100,000 with equipment. Mylchreest & Reynolds, 238 Palm street, are consulting engineers.

New York

BUFFALO—Buffalo sewer authority has voted to award contract for disposal plant pumping station to Bryant & Detwiler Co., Detroit, at $1,713,571. Final award awaiting PWA approval.

BUFFALO—Atlas Pattern Works Inc. has been formed by Nelson H. Staley, Genesee building, to manufacture patterns and castings.

NEW YORK—K. & R. Metal Products Inc., Manhattan, has been formed to deal in tools and machinery. Burt Franklin, 500 Fifth avenue, New York, is correspondent.

NEW YORK — United States Engineer

(*Please turn to Page* 98)

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(*Continued from Page* 96)

Office, 39 Whitehall street, New York, will take bids until December 28 for furnishing all labor and materials and performing all work for repairing U. S. hopper dredge MARSHALL, schedule 1097-37-144.

NEW YORK — New York World's Fair for 1939, L. B. Roberts, acting chief engineer, Empire State building, will let all contracts by competitive bidding. All firms bidding on construction work must be prequalified; forms are available at Fair offices, Empire State building.

VALLEY STREAM, N. Y.—Accurate Metal Craft Inc. has been formed to deal in metal products. Oscar Katz, 92-32 Union Hall street, Jamaica, is correspondent.

New Jersey

BELLEVILLE, N. J.—Wallace & Tiernan Co. Inc., 11 Mill street, manufacturer of equipment for water and sewage purification systems, is receiving bids on general contract for three one-story additions at a total cost of about $200,000 with machinery. Fletcher Thompson Inc., 136 Fairfield avenue, Bridgeport, Conn., is architect and engineer.

Pennsylvania

PITTSBURGH — Dravo Contracting Co., 4801 Neville Island, is building 210 x 150-foot assembly shop at its marineways on Neville Island, complete with 20-ton erection and 5-ton assembly cranes.

Illinois

BELLEVILLE, ILL.—Enterprise Foundry Co., East B street and L. & N. tracks, has permit for erection of $1000 addition to molding shop.

CHICAGO — R. E. Ellis Engineering Co., 565 West Washington street, has been incorporated to deal in machinery, engineering and hardware specialties, by T. Fisher and associates.

CHICAGO—Central Steel & Wire Co., 4545 South Western avenue, has purchased site in Kenwood manufacturing district on West Fifty-first street between Francisco avenue and South Whipple street.

Alabama

DECATUR, ALA. — Alabama Water Service Co. petitioned Alabama public service commission, Montgomery, for authority to construct $100,000 filtration plant.

FLORENCE, ALA. — Martin Stove & Range Co. moulding department was destroyed by fire Dec. 13 with heavy loss.

JACKSONVILLE, ALA. — City receives bids Dec. 23 for construction of $60,000 sewage system. Polglaze & Basenberg, Webb-Crawford building, Birmingham, are engineers.

MONTGOMERY, ALA.—City receives bids Jan. 5 for $332,000 waterworks extension. Work includes drilling of six wells, erection of 1,000,000-gallon elevated reservoir, and construction of distributing facilities. F. N. Billingsley, Interstate building, New Orleans, La., is consulting engineer.

WILTON, ALA. — City receives bids Dec. 22 for construction of waterworks system at an estimated cost of $29,000. John M. Gilfillan, Lyric building, Birmingham, is engineer.

Maryland

BALTIMORE — Flynn & Emrich Co. has awarded contract for construction of foundry on Grantley road to Edward L. Walsh, 1508 Bolton street. W. S. Austin, Maryland Trust building, is engineer.

District of Columbia

WASHINGTON — Procurement division, veterans administration, Arlington building, will receive bids until Dec. 23 for various sizes and quantities of drill points, chisels, clamps, nippers and files. Invitation No. 322-M, for delivery at supply depot, Perry Point, Md., and Chicago, Ill.

WASHINGTON — Office of the general purchasing officer, Panama Canal, will take bids until Dec. 23 for various structural steel channels, steel rotating shelving units, insulation-shearing machine and motor track cars, schedule No. 3205, for delivery either Cristobal or Balboa, Canal Zone, Isthmus of Panama.

WASHINGTON — Procurement division, treasury department, federal warehouse, will receive bids until Dec. 23 for one set of electrical controls for pump system, invitation RA-1724-L, for delivery Jersey Homesteads project site, Highstown, N. J.; and for various quantities of steel reinforcing bars and mesh, invitation RA-1690-K, for delivery Loma, Colo.

WASHINGTON — Panama Canal, office of the general purchasing officer will open bids Dec. 28 for furnishing steel bars, twist drills, dies, taps, auger bits, coil chain, automobile jacks, steam flushing and cleaning equipment, telephone cable, bare copper wire, brass drills, cold chisels, wood chisels and diamond point glass cutters, schedule 3207, for delivery either Cristobal or Balboa, Canal Zone, Isthmus of Panama.

WASHINGTON — Bureau of supplies and accounts, navy department, will receive bids until Jan. 5 for miscellaneous quantities of wire rope, schedule 9497, and turbine pumps, schedule 9516, for delivery various east and west coast points; for three electric industrial trucks, schedule 9503, for delivery Mare Island, Calif.; miscellaneous quantity of insulated electric cable, schedule 9505, for delivery Philadelphia and Mare Island; miscellaneous wrought bar iron, schedule 9506, for delivery Boston.

Georgia

CARTERSVILLE, GA. — Barite plant operated by Thompson Weyman Co. was damaged by fire Nov. 30. Estimate of damage was given as about $200,000.

NEWNAN, GA.—City receives bids Jan. 8 for $25,000 waterworks extension. Wiedeman & Singleton, Candler building, Atlanta, are engineers. (Noted Dec. 7)

Kentucky

BARDSTOWN, KY. — Bardstown Distillery Inc. plans expansion and installation of additional equipment.

HARTFORD, KY. — City will soon call for bids for construction of waterworks system, including 75,000-gallon elevated tank and tower, pumping machinery and accessories. Cost will be approximately $380,000. Thornton & Westcott, Carry building, Owensboro, are consulting engineers.

LANCASTER, KY.—City receives bids Dec. 30 for $77,000 sewer plant and collecting system. J. Stephen Watkins, 606 Citizens Bank building, Lexington, is engineer. (Noted Nov. 2)

HENDERSON, KY.—Henderson County Rural Electrification Association Inc., receives bids Dec. 28 for construction of 158 miles of rural transmission lines in Henderson county. J. B. Trice, 215 North Elm street is supervising engineer.

Mississippi

HOLLY SPRINGS, MISS.—City voted $300,000 bonds for construction of rural electric lines for utilization of TVA power.

OXFORD, MISS. — City will vote Jan. 12 on $55,000 bond issue for additions to municipal light plant equipment, including proposed installation of 750-horsepower engine.

North Carolina

ALBEMARLE, N. C. — Mayor M. J. Harris and board of aldermen open bids Jan. 6 for construction of sewage treatment plant and incinerator. P. H. Carlton is town clerk; William C. Olson, Raleigh, is consulting engineer.

CHARLOTTE, N. C. — City council has selected Robert & Co., Bona Allen building, Atlanta, Ga., as engineers for preliminary survey of proposed improvements in waterworks system estimated to cost $1,000,000. Alice B. McConnell is city clerk.

TARBORO, N. C. — City will soon begin work on 32-mile power line from here to Hassell at an estimated cost of $22,000. J. C. Martin is superintendent of public works.

South Carolina

LAURENS, S. C. — Rodgers Hosiery Co. Inc., Wyoming and Stenton avenues, Philadelphia, Pa., plans to establish hosiery manufacturing plant here. Negotiations for building are being carried forward, will remodel and install 40 machines. C. F. Rodgers is president. L. C. Barksdale, secretary, Laurens business league, is interested in locating the plant.

SPARTANBURG, S. C. — Taylor-Colquitt Co., 290 East Main street, manufacturer of creosoted materials, plans expansion of plant facilities to increase capacity 25 per cent. Plans include additional railroad trackage, storage tanks and locomotive cranes.

Tennessee

JACKSON, TENN. — City plans to vote March 4 on $364,000 bond issue for construction of electrical distribution system. (Noted Nov. 2).

LEWISBURG, Tenn. — Marshall Stove works, branch of Florence Stove Co., Gardner, Mass., was destroyed by fire Dec. 9. Plans are under way for rebuilding plant.

MEMPHIS, TENN. — Julian Pitts, press & Storage Co., T. L. Green, secretary, will erect three warehouses at an estimated cost of $35,000. J. E. Morrison is in charge of construction.

West Virginia

BLUEFIELD, W. VA.—Sanitary board receives bids until Dec. 22 for furnishing and installing pumping equipment in connection with construction of two sewage disposal plants. W. A. Light is chairman of the board; Morris Knowles Inc., 507 Westinghouse building, Pittsburgh, Pa., is engineer.

HUNTINGTON, W. VA. — Public buildings branch, Treasury Department, Washington, D. C., will take bids until

(*Please turn to Page* 100)

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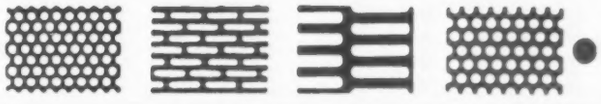

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(*Concluded from Page 98*)

Dec. 30 for installation of air conditioning system, including conduit and wiring system, in post office and courthouse here.

WHEELING, W. VA. — Wheeling Steel Corp., plans construction of additional furnace and improvements in tube department at its Benwood plant. B. F. Hazeltine is general superintendent of the Benwood plant.

Virginia

COVINGTON, VA. — City receives bids Dec. 29 for construction of waterworks. Wiley & Wilson, Peoples Bank building, Lynchburg, are engineers.

KILMARNOCK, VA. — Virginia East Coast Utilities Inc. plans construction of 12 miles electric lines from Kilmarnock through Lancaster to Lively. Rights of way are being secured.

RICHMOND, VA. — City department of public works will receive bids until Jan. 4 for construction of two-story steel and concrete warehouse, 75 x 130 feet, with elevator and electric lights and power facilities. G. M. Bowers, 1111 East Broad street, is director of public works.

Missouri

WINDSOR, MO.—City has applied to PWA for funds to construct sewage disposal plant and additional sewer lines. W. R. Rollins & Co., 339 Railway Exchange building, Kansas City, are engineers.

Arkansas

MAMMOTH SPRINGS, ARK.—PWA receives bids Dec. 22 at State Capitol, Little Rock, for construction of $36,364 waterworks, including well, elevated steel tank and tower, pumphouse and complete distribution system. Hugh R. Carter, 607 National Standard building, Little Rock, is engineer.

VAN BUREN, ARK.—Rush Canning Co., Chicago, has begun work on canning factory here.

Oklahoma

MEDFORD, OKLA. — Grant County Rural Electrification Association will start work soon on $180,000 project for rural power distribution.

PAWNEE, OKLA.—City plans construction of sewage disposal plant estimated to cost $47,000. W. R. Holway, 302 East Eighteenth street, Tulsa, is engineer.

Texas

ALICE, TEX. — City plans construction of waterworks, including pump station and distribution system, at a cost of $80,000. Dr. R. R. Graham is mayor; J. E. Ward, Harvey-Snider building, Wichita Falls, Tex., is engineer.

ALVORD, TEX. — City will construct waterworks and sewerage system, including pump station, disposal plant, etc. Cost is estimated at $70,000. Hawley Freese & Nichols, Capps building, Fort Worth, are engineers.

ATLANTA, TEX. — City voted approval of bonds for construction of waterworks and sewers. F. J. VonZuben, Electric building, Fort Worth, is engineer.

AUBREY, TEX. — City will construct waterworks and sewers at a cost of $37,000. O. A. Lipstner is mayor; Hawley, Freese & Nichols, Capps building, Fort Worth, are engineers.

BLOSSOM PRAIRIE, TEX. — City has applied to PWA for allotment toward construction of sewerage system and disposal plant estimated to cost $24,000. Hawley, Freese & Nichols, Capps building, Fort Worth, are engineers.

BROWNSBORO, TEX. — City plans construction of waterworks, including erection of 50,000-gallon tank, estimated to cost $53,000. F. J. VonZuben, Electric building, Fort Worth, is engineer.

CORPUS CHRISTI, TEX.—Hamilton & Sons Canning Co., New London, Wis., is erecting vegetable canning plant near here.

CORPUS CHRISTI, TEX. — Barnsdall Oil Corp., Petroleum building, Tulsa, Okla., is considering erection of $1,000,000 refinery here, with daily capacity of 10,000 barrels.

MARSHALL, TEX. — Julian Pitts, Elysian Fields, president, Harrison-Panola Electric Membership Corp., will construct an 85-mile power line at an estimated cost of $80,000.

ROCKWALL, TEX.—C. M. Curfman will construct 202 miles of rural electric lines in Rockwall and Collins counties. REA has approved allotment of $200,000.

Wisconsin

APPLETON, WIS. — Appleton Machine Co., maker of pulp and paper mill machinery, has increased capital stock from $30,000 to $40,000 for expansion of plant and production. Definite plans have not been announced. F. E. Saecker is president.

MILWAUKEE — Harnischfeger Corp. has received order from Inland Steel Co., Chicago, for two 50-ton and one 30-ton electric traveling cranes for new mill at Indiana Harbor, Ind., at a price of $125,000.

MILWAUKEE — Wacho Mfg. Co., 3048 West Galena street, specializing in reconditioning milk cans and other galvanized containers, plans shop addition costing about $25,000 with retinning and other equipment. John S. Crandall is head of firm.

MILWAUKEE — Milwaukee Valve Co., 2375 South Burrell street, sustained heavy loss on Dec. 14 when fire wrecked its foundry department. Erection of fireproof building and replacement of equipment is contemplated. Valentine Fina is president and general manager.

Kansas

LEROY, KANS.—City will take bids until Dec. 23 for construction of waterworks system, including erection of 50,000-gallon steel tank on 100-foot tower. Cost will be approximately $60,000. L. V. Border is city clerk; Archer & Co., 609 New England building, Kansas City, Mo., are engineers.

Iowa

JEFFERSON, IOWA — Greene County Rural Electric Co-operative has received an allotment of $95,000 for construction of 194 miles of rural transmission lines in Greene and Webster counties.

LOGAN, IOWA—Harlan County Rural Electric Co-operative will take bids before Jan. 1, 1937, for construction of 200 miles rural transmission lines. Cost is estimated at $200,000. H. S. Nixon, Exchange building, Omaha, Nebr., is engineer.

TIPTON, IOWA—Cedar County Rural Electric Co-operative has received $100,000 allotment from REA for construction of 210 miles of rural transmission lines to distribute power purchased at Muscatine, Iowa.

Nebraska

OMAHA, NEBR.—Nebraska Power Co. has been granted franchise by Nebraska state railway commission for construction of about 40 miles of transmission lines in Colfax, Dodge and Cass counties. Cost will be approximately $28,000.

Montana

HELENA, MONT. — Ravalli County Co-operative Electric Association has grant of $125,000 from REA for construction of 125 miles of transmission lines.

Idaho

BOISE, IDAHO — Northern Idaho Rural Electric Rehabilitation Association has REA grant of $173,000 for construction of 143 miles transmission lines in Boundary county and one of $35,750 for construction of 35 miles of lines in Bonner county.

Pacific Coast

OAKLAND, CALIF.—Moore Dry Dock Co. has plans for erection of one-story structural shop at shipbuilding and repair plant here. Cost will be about $50,000 with equipment.

JEWELL, OREG. — Nehalem Valley Co-operative Electric Association has REA funds for improvements and extensions to its electric distribution system.

KELSO, WASH. — Henry C. Kling has established an auto body works at Fifth and Oak streets.

PULLMAN, WASH. — Carter Implement Co. has been incorporated at $15,000 by K. W. Carter and associates, to deal in farm machinery and auto equipment.

SEATTLE — Sound Furniture Co., 1815 North Thirty-fourth street, is rebuilding its plant, recently damaged by fire.

SEATTLE — Markey Machinery Co. has acquired business of Allan Cunningham Co., maker of auxiliary marine equipment; Doran Co. has taken over manufacture of Cunningham air whistles.

SPOKANE — Spokane county rural electric co-operative at Plaza has been alloted $290,000 by REA for construction of 205 miles distribution line and purchase of 900-kilowatt diesel generator unit.

TACOMA, WASH. — Harkins Motor Co. will erect warehouse and office building, 120 x 200 feet. Plans are by Silas E. Nelsen.

WALLA WALLA, WASH. — International Harvester Co., A. O. White, representative, plans construction of sales, service and warehouse plant, 193 x 127 feet, to cost $30,000.

WHITE SALMON, WASH. — Preliminary surveys are under way for construction of proposed water system under PWA grant of $67,636. It is expected to call for bids Jan. 11.

Canada

HAMILTON, ONT. — Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has plans for one-story addition to branch plant here, operated by Canadian Westinghouse Ltd. Cost is estimated at $100,000. Hutton & Souter, Piggott building, Hamilton, are architects.